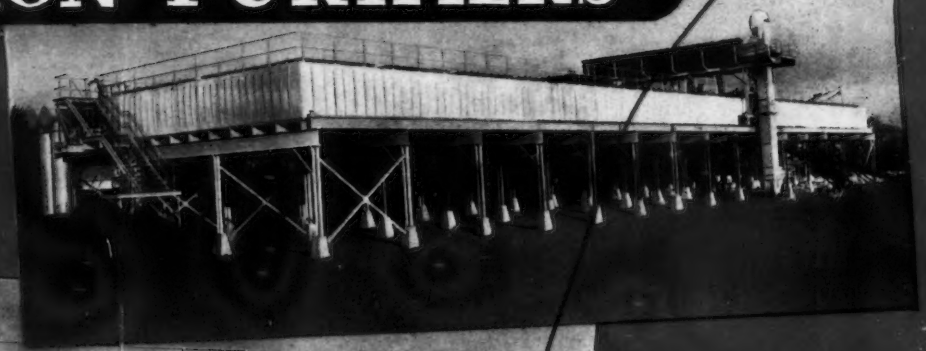
Gas Journal

VOL. 284. 107th YEAR. LONDON, NOVEMBER 30, 1955. Nº 4826. PRICE 1/6

TECHNOLOGY DEPT.

AST IRON PURIFIERS

DESIGNED



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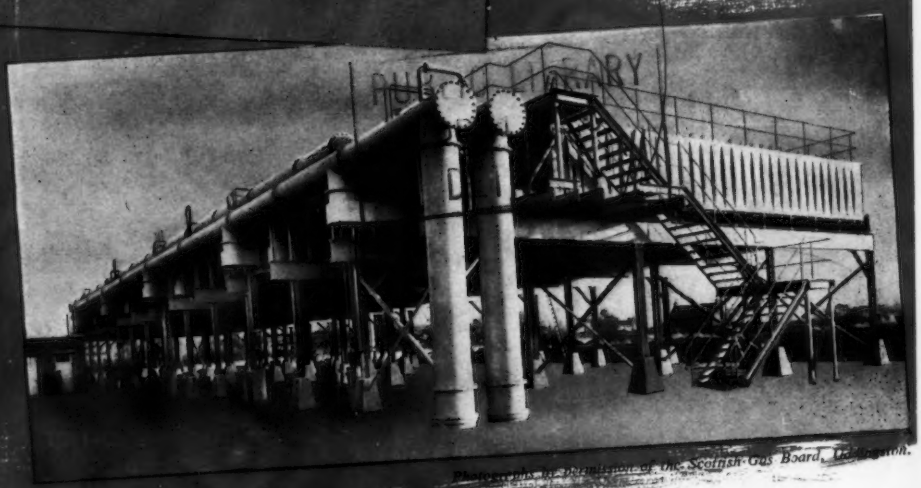

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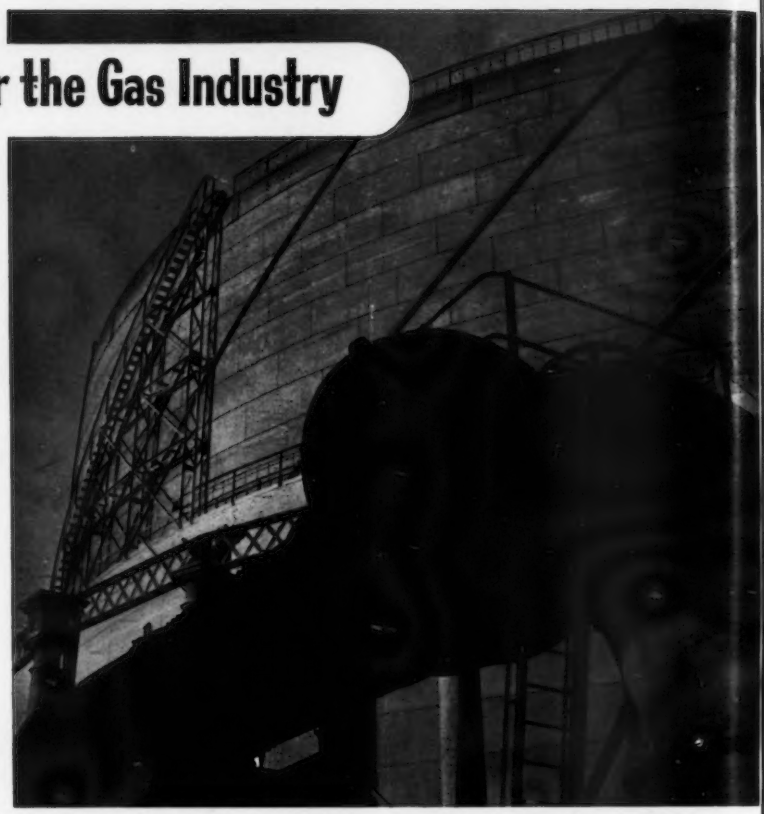

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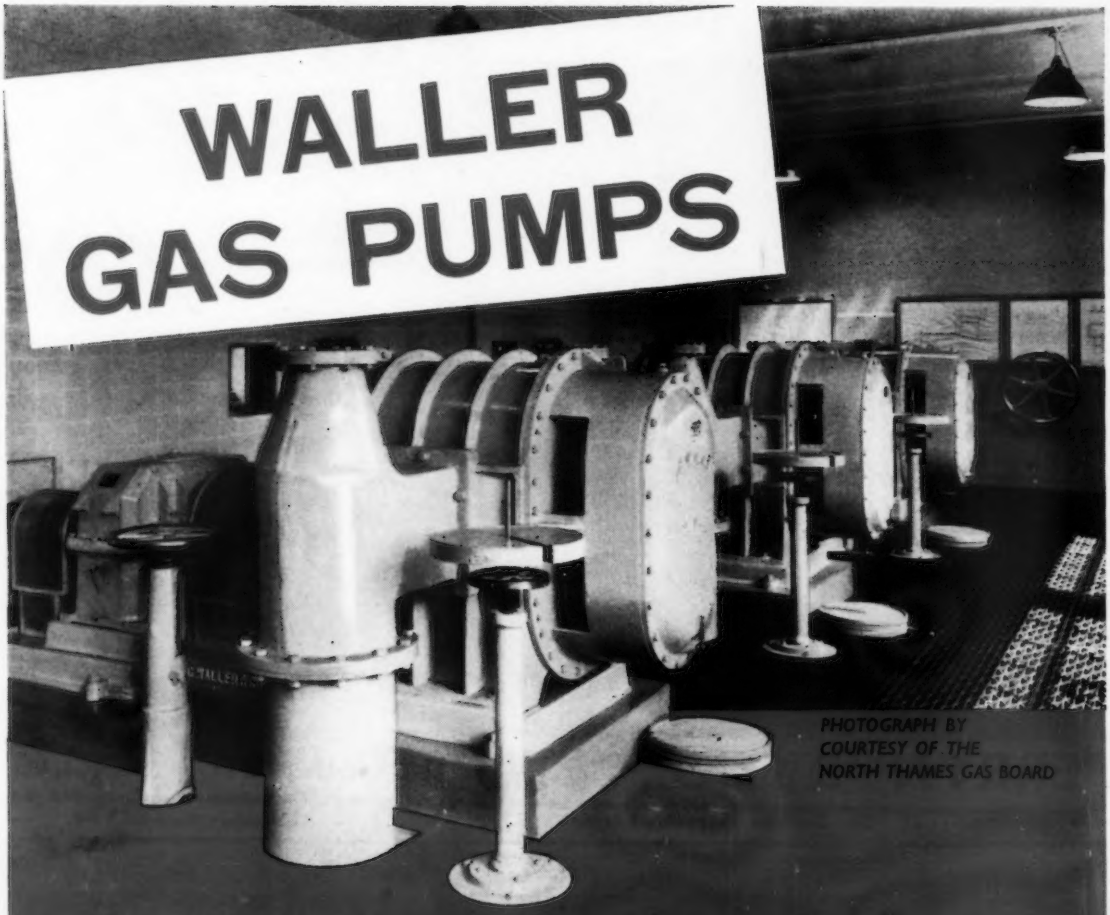

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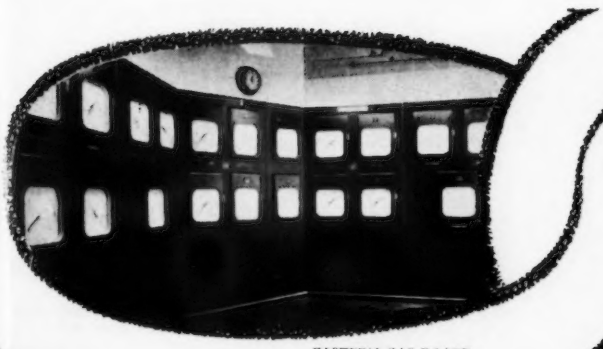

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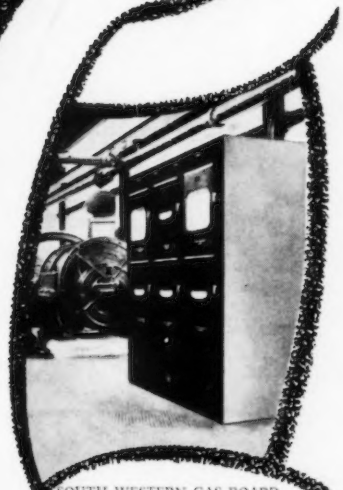

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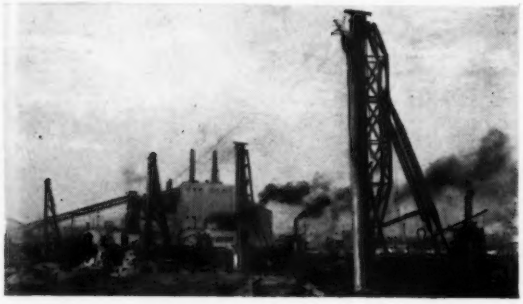

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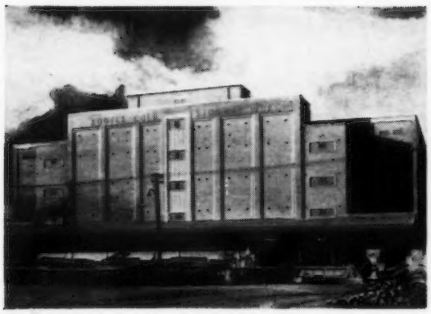

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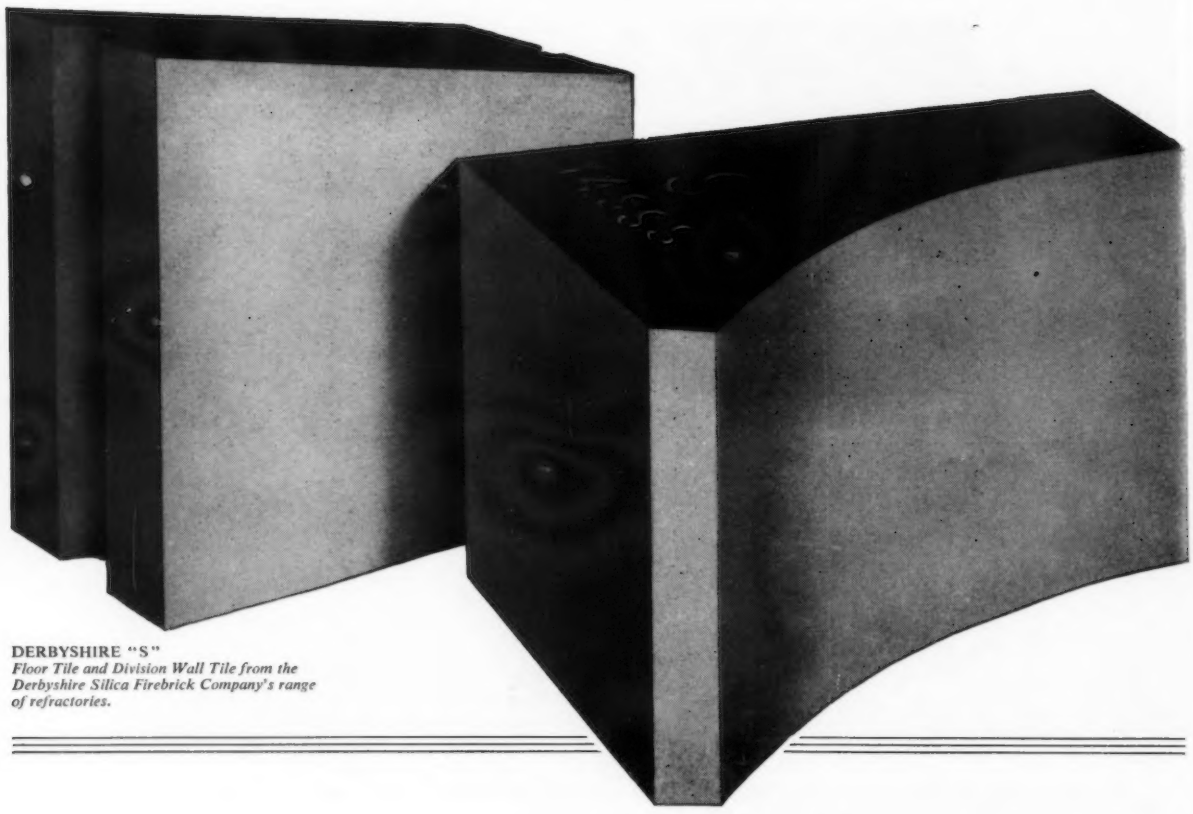

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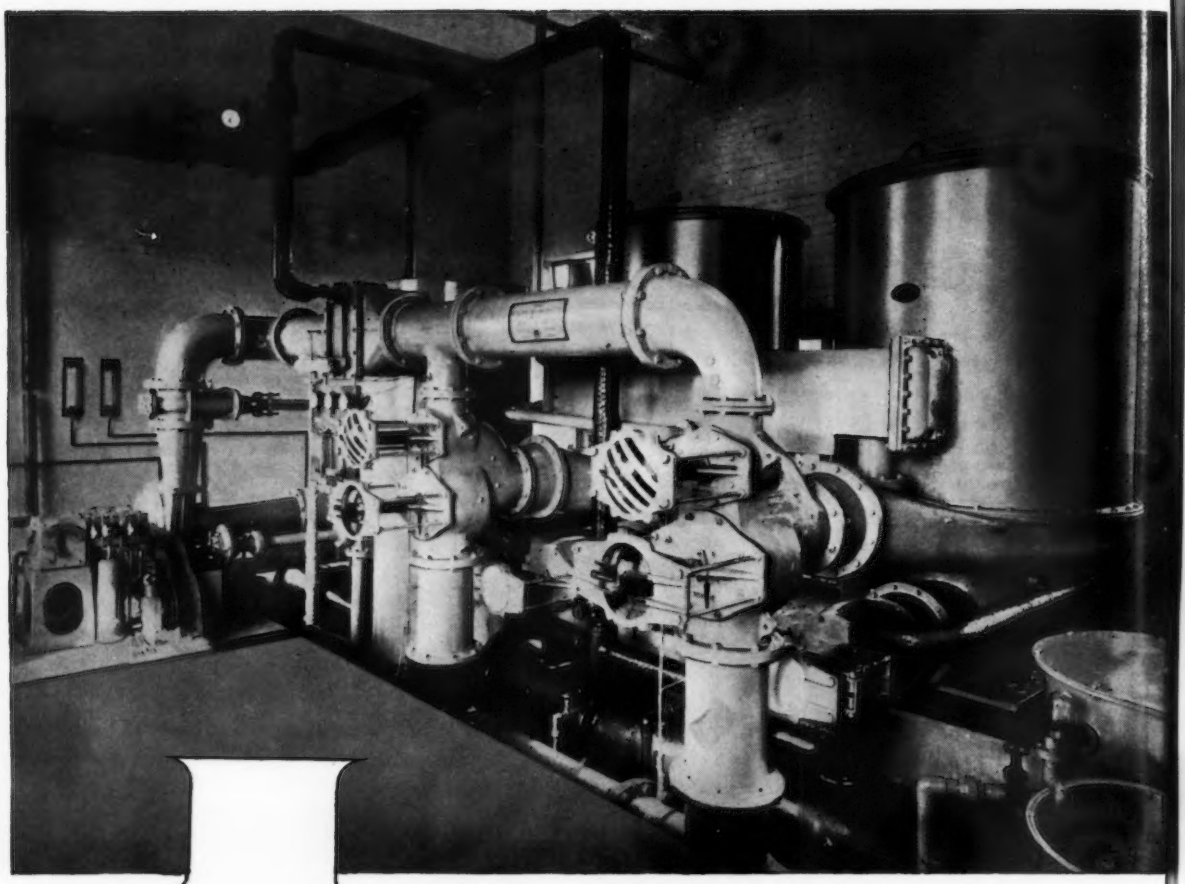

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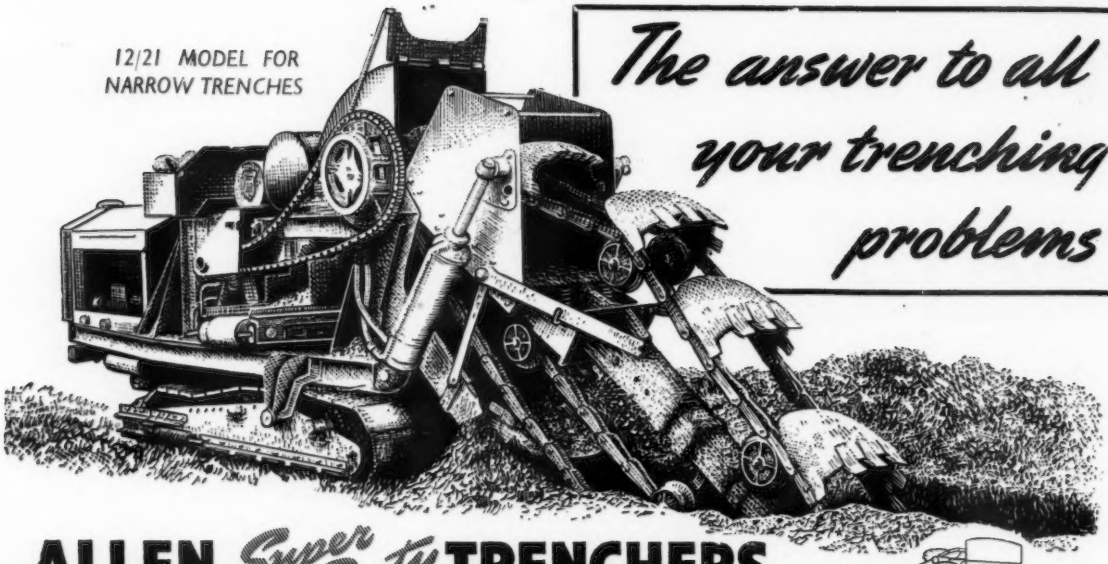

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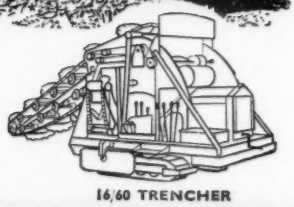

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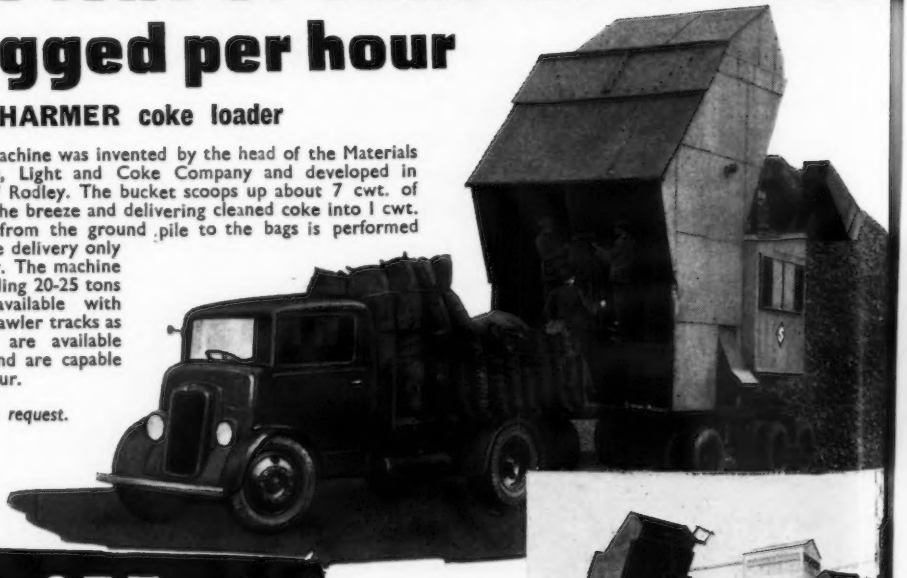

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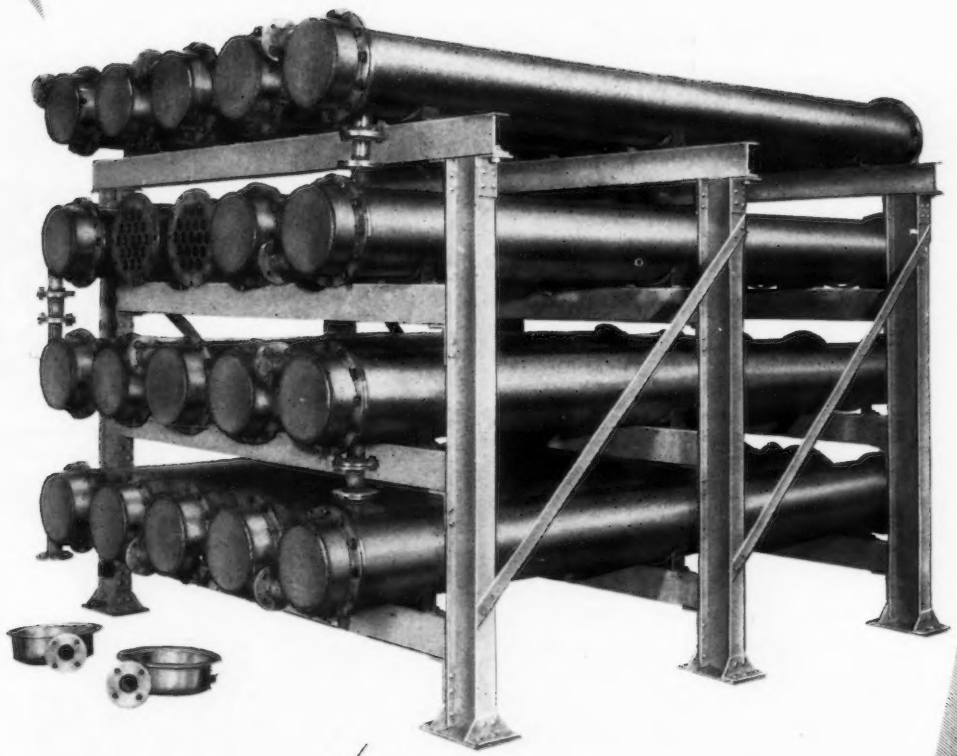

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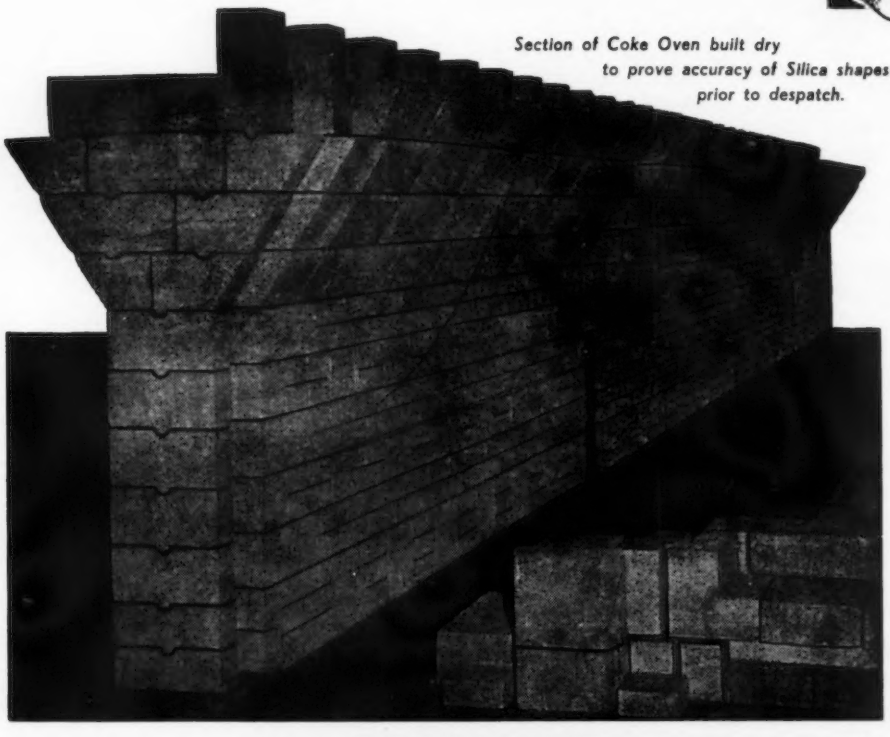

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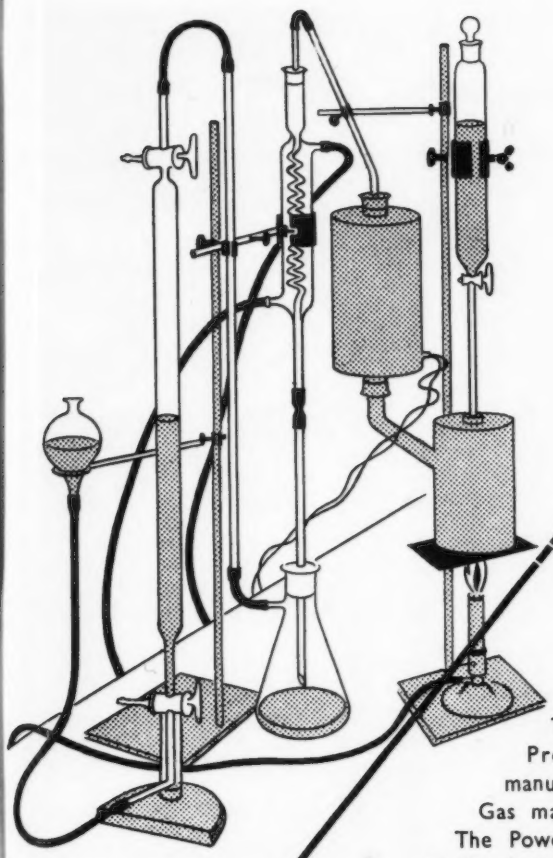

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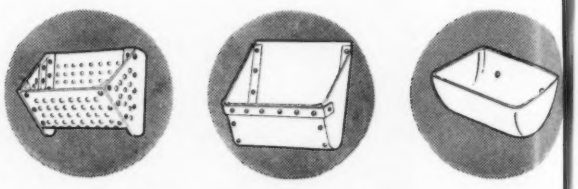

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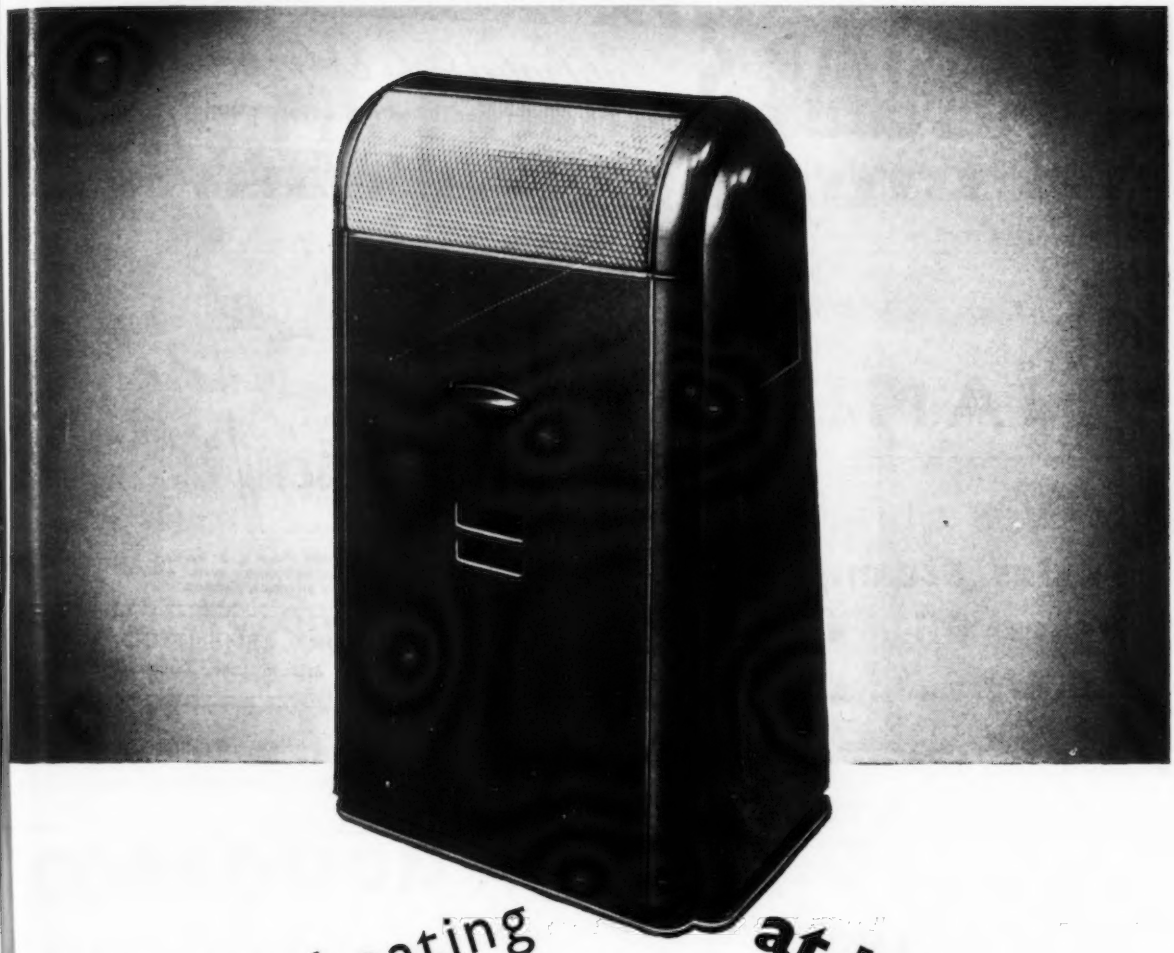

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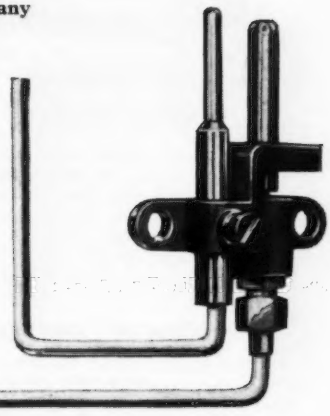

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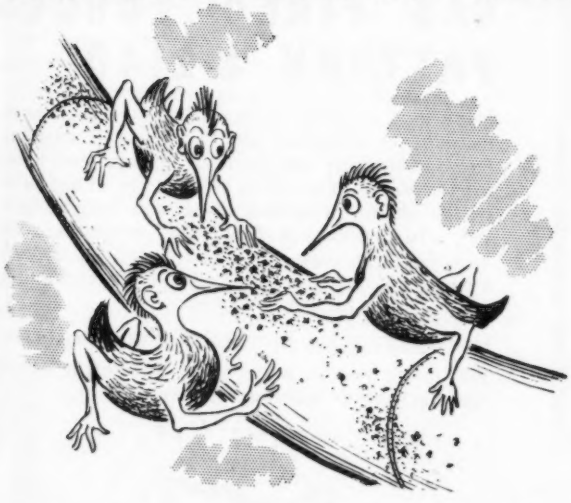

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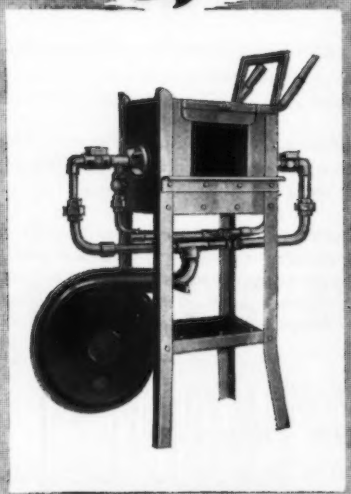

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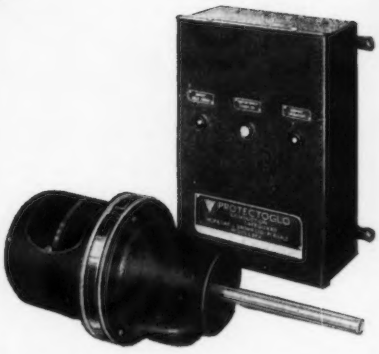

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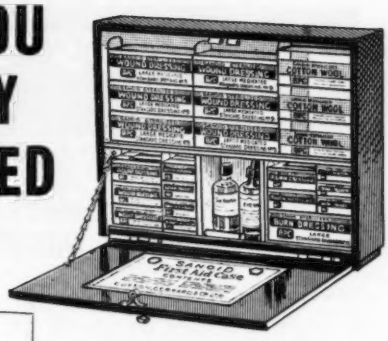

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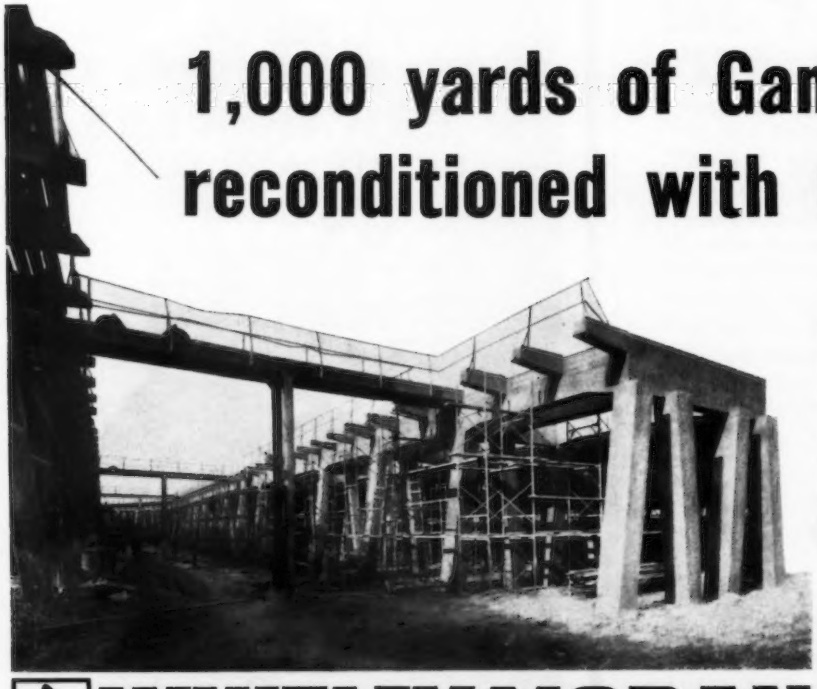

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Coke and Clean Air

AT the Institution of Gas Engineers Research Meeting last week, listening to the ebb and flow of discussion on the Symposium of Coke, we could not help feeling that the foundations of an adequate supply of domestic solid smokeless fuel are still as uncertain as ever they were. The Symposium illustrated very effectively the prodigious efforts which the gas industry will have to make to increase its output of coke by something of the order of 3 mill. tons a year—only a fraction of the amount envisaged in the Beaver Report. A re-arrangement of standard manufacturing practice, the re-assessment of carburetted water gas, greater attention to coal blending and coke allocation, all these and more will have to be considered to achieve a relatively small increase in the amount of coke available to the domestic consumer. Most of the suggestions contained in the Symposium concern the technical means whereby the industry, as at present equipped and organized, could find more coke for the domestic market, but it is made abundantly clear also that the economics of gas and coke production may well be drastically affected by the alterations in manufacturing technique implied.

Obviously the problem is not one that can be solved by half measures. Parliament has taken a firm stand for the abolition of smoke—in fact, during the recent Second Reading of the Clean Air Bill, members on both sides of the House expressed disappointment that the proposed measures were not more rigorous. From this it should follow that, ' having willed the ends Parliament would will the means.' It is quite vain for our legislators to pontificate about the inestimable benefits of clean air if they do not provide the means whereby their hopes —and the hopes of the nation—may be realized. If it is accepted, as it has been by the Beaver Committee, that for some years the main space heating load in our homes will be carried by solid fuel then it can be deduced that no real impression will be made on the smoke menace until enough suitable solid fuel is available. When one asks where such a quantity of solid fuel is to come from the answer must be the carbonizing industries—chiefly the gas industry. The Beaver Committee, in their Report, recognized the role of the gas industry in this respect. However, nobody can ' build bricks without straw.' To manufacture coke in the quantities required the industry must have more plant and much more coal. Not only must the quantity of coal be right but also its quality; furthermore, it must be obtainable at a cost permitting the sale of the resulting coke at a price which will actively discourage people from burning coal.

This question of price and quantity was brought into sharp focus during the discussion on the Symposium when an exchange occurred between Dr. G. E. Foxwell and Sir Harold Smith. Dr. Foxwell, contributing to the Discussion said that at Bournemouth two years ago (the 1954 Summer Meeting of the Institution) he asked for the gas industry's help in bringing about the abolition of smoke, and that Sir Harold replied ' If this was to be done he (Dr. Foxwell) should exert whatever influence he happened to possess to obtain more coal for the gas industry.' At this juncture Sir Harold interrupted the Discussion to say ' I referred to price ' to which Dr. Foxwell replied, ' No you did not, you referred to quantity.' On consulting the records we find that Sir Harold's memory is better than Dr. Foxwell's, since what Sir Harold said was, ' If Dr. Foxwell will use his influence to get the price of gas coal reduced in relation to the price of domestic fuel, we can produce the coke.' However, as far as the gas industry is concerned both the amount of coal available and its price are equally important to the solution of the problem. Unless both requirements are satisfied the industry will certainly not be able to produce the amount of coke needed at a competitive price.

The only satisfactory way in which to implement the clean air proposals is through a national fuel policy which makes proper provision for the essential prerequisites of the policy. As we see it coal is likely to become less important for the production of electricity in the coming decades as atomic energy takes over the load. Coal, however, will remain the chief source of those forms of heat which electricity cannot supply, *i.e.*, the gaseous flame and solid fuel. The changing pattern of fuel supplies demands some kind of plan to co-ordinate the present deficiency of coal with the growing use of oil, the impending introduction of atomic power, and above all the clean air proposals. In many ways the gas industry has more to lose than the other fuel industries by the present lack of a national outlook on fuel, for it is in the next 10 years or so that its best opportunities will probably lie. If in the next decade or two it has not established itself as the supplier of all, or nearly all, the solid smokeless fuel required in this country and if, at the same time, it has not

secured markets for those quantities of gas which will also be produced, then the best opportunity in its history will be gone for good.

It is suggested in some quarters that the gas industry should produce only gas, and that the consumers should be coerced into using it for space heating in preference to the popular solid fuel. However, the position has not yet been reached when such a proposition would be accepted even if it was expedient. It may be that in due time, through education, people will come to appreciate the value of refined fuels more than they do at present, and if and when they do, the gas industry will be able to meet their need, only if it has the gasmaking capacity at its disposal. For the present, however, solid smokeless fuel is number one priority, and the nation is looking to the gas industry to meet the need. 'Only by additional carbonization can really substantial additional quantities of coke be placed on the market,' said Mr. Henry Jones in his contribution to the Coke Symposium, and who can doubt but that he has the real—the only—answer. Either the gas industry has the plant and the coal necessary to fulfil its obligations as the nation's chief supplier of solid smokeless fuel or the clean air policy will be stifled even before it is born.

Gas Education

MR. Dyde's presentation of the 32nd Report of the Gas Education Committee is so full and so masterful in its high-lighting of the essential features of the present position that only specialists will need to study the Report itself in detail. We have reported Mr. Dyde's remarks practically in full. But to our mind, perhaps the most important passage in the long run is that in which he refers to the interchange of examinations between the several Institutions. So far there has been a time-wasting overlapping of examinations. The young recruit to engineering has found himself spending three, four or sometimes five years qualifying himself for corporate membership of one technological institution and then, if he wishes to change his direction or enlarge his scope by qualifying for another, he finds himself called upon to pass another one or two examinations. And this burden is not entirely removed by the most generous exemptions. Now, we note with great satisfaction, Part I of the Common Associate Membership Examination, in a satisfactorily amended form, is to be used by other Institutions 'and, of course, ourselves.' The other avenue to corporate membership is by way of the Higher National Certificate machinery. And now we are to have 'complete exemption' accorded, subject to quite appropriate conditions, to the new and promising sandwich courses whose success is largely due to Mr. Teasdale, the able and energetic Education Officer of the North Western Area Gas Board.

We should like to suggest one other direction in which an advance on these lines might be made. We are thinking of the Institute of Fuel, a body which is tolerably well supported by gas engineers but with which a closer liaison would be valuable. A Chartered Gas Engineer seeking admission to corporate membership of this Institute is still required to pass another two examinations in fuel technology which exhibit considerable overlapping with those he has already passed. This is an anomaly which should be removed. It is not, of course, for the Institution to go cap in hand to the Institute, but young technicians with wide ambitions are more directly interested and would be very grateful for any easing of this unnecessary burden on their time and energies which might result from negotiations.

Turning to detail, the complaint is again made that students are inexperienced in approaching the questions of the examination papers. It is complained, and not only in our own scheme, that students present themselves for examinations in a hopelessly untrained condition. It is suggested that teachers should not present students for examination without a period of practice in dealing with past and model examination papers, and that no student should be encouraged to enter for the examination who does not exhibit a satisfactory facility in this delicate art—the art of persuading the examiner that you know something about the subject, of, in short, putting your goods in the window.

Reverting to the sandwich system, Mr. Bruce's suggestion for the extension of the system over the whole country should be carefully noted. It seems to be particularly well suited to the case of students unable for one reason or another to make continuous attendance at a college in evening or other part-time courses. For one thing colleges offering suitable courses are few. Mr. Bruce has specified 16 as the minimum number of students who must continually come forward for a course to be practicable. He doubts whether any one area, apart, we assume from the two 'London' areas, could put forward so many students. He makes the valuable suggestion that the subject should be reviewed by the industry as a whole and that neighbouring areas should combine in some geographical centre in the institution of suitable schemes.

Dr. Haffner's lively account of observations of American gas education facilities made by the British Delegation to the International Gas Union conference was entertaining as well as informative. It emphasized two things, the stress laid on salesmanship and consumer service in the States, and the amount of money which the American gas industry is prepared to put into the education and training of its recruits.

NALGO Jubilee

WHAT better setting could there be for the Golden Jubilee Dinner of NALGO on November 25 than the restored glory of Guildhall, which has been a symbol of civic government for more than a thousand years? Here was splendour of tradition and new building on old foundations comparable with the tradition and growth of this unique trade union, which has built its structure on good employer-employee relations and service to the community. As the Rt. Hon. Duncan Sandys, the Minister of Housing and Local Government, put it when proposing the toast of NALGO: 'Local government is one of the basic elements in our national life, and the success and progress of local government in the future will continue to depend on the integrity and devotion to duty of its members'. And as the President, Mr. P. H. Harrold, O.B.E., reminded us: 'The members of NALGO include master mariners and orchestral conductors,

bank clerks and golf professionals, farmers and race-course managers, printers and theatre directors . . . . We have transformed that extraordinarily diverse collection of individuals into a single, united, self-conscious and efficient public service'. Needless to say, among that 'diverse collection' is a large number of gas and electricity employees and so, in addition to such eminent people as Mr. Attlee and Mr. Clement Davies, the 500 guests included such representatives of our industry as Mr. J. R. W. Alexander, Dr. A. B. Badger, Mr. W. E. Webb, and Mr. F. C. Henfrey-Smith.

It is perhaps appropriate that we should recall certain of the aims, objects and achievements of NALGO, which has the distinction of being the largest 'black-coated' organization in the country. Since the Association was founded a half century ago as a federation of eight provincial guilds of local government officers and a London Municipal Officers' Association, it has increased the number of its members from 8,000 to 230,000, its annual income from £50 to over £500,000, its assets from £2 16s. 0d. to £12½ millions, its staff from one honorary secretary to 280 (including the staffs of its ancillaries) and the number of its branches from 8 to 1,350. It has taken the lead—for many years alone—in abolishing jobbery and nepotism, Bumbledom and bureaucracy from local government, and in transforming it into a public service that is a model to the world. It has extended its interests from one public service to seven.

Sir Harold Smith has paid this tribute: 'NALGO's path has not always been an easy one to tread. It now contributes to the well-being of its members in many directions outside those which might be said to represent the normal activities of a trade union . . . . I have always felt it a great honour to preside over the joint councils with which NALGO is connected so intimately and on which its representatives play such an important and active part'. No doubt the contributions to its members' welfare to which Sir Harold referred include NALGO's justly renowned legal department, insurance company, building society and provident society, and the extensive education and training facilities which the Association has created; and let us not forget the two holiday centres, the private hotel, the travel bureau, and the two convalescent homes. Truly a remarkable achievement. For our part we congratulate NALGO on 50 years of progress and trust that during the next 50 the Association will continue to expand on the same basis of encouraging personal efficiency, adherence to responsible trade unionism, and reasonable negotiation which has characterized its growth thus far.

RUSSIANS VISIT BRITISH GAS INDUSTRY

ANGLO-RUSSIAN negotiations, as revealed in our newspapers, suggest that the Iron Curtain has not after all been raised, but has merely sustained a fracture. Perhaps because of the extraordinary pressure being exerted by the powers on both sides this chink has permitted a very limited but nevertheless valuable coming and going. A growing number of people are finding out how the other half lives, and more particularly how the other half works, plans, and experiments. This exchange of information and experience can do nothing but good, and there can be little doubt that, particularly in industrial matters, both sides have something to learn from the other.

Typical of the activity now going on was the arrival in Britain last week of six Russian fuel experts, here for a tour of gas industry installations. Characteristically, they packed as much as possible into the five days at their disposal. Arriving from Paris on the Golden Arrow on Monday night, November 21, they visited Fulham gas-works on Tuesday morning, attended the Institution's Autumn Research Meeting lunch at the Savoy, and in the afternoon inspected the Gas Council's Watson House Centre. On Tuesday night they left for Birmingham, visited works of the West Midlands Gas Board on Wednesday, and on Thursday morning left Birmingham for Manchester to see works of the North Western Gas Board. Having seen their fill of the North West by Friday afternoon, they returned to London in order to visit South Eastern Gas Board works on Saturday. On Sunday they left London for Germany, where presumably this high-speed inspection of gas plant will be repeated. Leader of the party was Mr. Alexandre Chelkov, Director of the General Bureau of the Coke Industry, Ministry of Iron and Steel. With him were Mr. Alexandre Evseev, Manager of the General Bureau of the Coke Industry, Mr. Platon Zarovni, Director of the General Bureau of Town Gasification, Ministry of General Economics, Mr. Petr Skafa, Chief Engineer, Ministry of Coal Industry, Mr. Alexandre Alexandrov, Chief Engineer of the General Bureau of the Gas Industry, Oil Ministry, and Mr. Sergei Terehov, Director of the Institute of Research into the processing of shale. As the oldest member of the gas Press, we would like our Russian visitors to know that we were delighted to have them with us, even for a very short space of time. Perhaps they and their friends will return on a future occasion and (rather hopefully, this), we may have an opportunity to see gas industry installations behind the Curtain.

INSULATION OF BUILDINGS

THE likelihood of any easing of the coal supply position in this country is as remote as ever, and it is hardly surprising, therefore, that in official circles every possible emphasis should be placed upon fuel saving as the best, if not the only, means of alleviating the situation. Assuming that we have only a limited amount of fuel at our disposal we are forced to conclude that as far as the heating of our factories, offices, homes, etc., is concerned, we must use it efficiently and enjoy a relatively high standard of comfort or waste it and go cold. Among the different methods which may be employed for the conservation of fuel and for its efficient use, insulation has a most important place—not least for the protection of buildings for loss of heat.

According to the preface to the recent publication of the Department of Scientific and Industrial Research entitled, *Thermal Insulation of Buildings* (H.M.S.O. 12s. 6d.), about 30% of the fuel used in industry goes into space heating, and of the total national consumption a still higher proportion is used to heat buildings of all kinds, domestic, public, commercial and industrial. Alongside these figures, it should be remembered that fuel used for space heating is generally burned with less efficiency than is fuel used in more directly productive industrial processes. It follows that the use of structural insulation to reduce fuel consumption can have a highly significant influence in the national economy. Intended as a manual for the use of building designers, the publication's contents have been compiled by the Building Research Station, to provide a convenient guide to the use of heat-insulating materials.

Personal Notes

MR. R. N. B. D. BRUCE, O.B.E., T.D., B.A., has been appointed by the Minister of Fuel and Power to be Deputy Chairman of the North Thames Gas Board in succession to MR. F. N. BIRKS, C.B.E., M.INST.C.E., M.I.MECH.E. The appointment will take effect from May 1, 1956, on the expiry of Mr. Birk's term of office. After graduating from Oxford with an Honours Degree in Chemistry, Mr. Bruce joined the Gas Light and Coke Company in 1929 as a Research Chemist in the Fulham Laboratories. He was engaged, among other things, on problems dealing with the hydrogenation of tars and oils and catalysis. Seconded to the South Eastern Gas Corporation in 1935 he acted as Technical Liaison Officer on the manufacture and supply side between the Gas Light and Coke Company and the Associated Companies. Two years later, he was appointed Assistant to the General Manager of the Gas Light and Coke Company, and during this period acted as Secretary of the London and Counties Road Tar Association, Secretary of the Gas Coke Export Association, and Secretary of the London and Counties Gas Development Association. Soon after his return from war service he was appointed Controller of Industrial Relations, and in 1949 was made Staff Controller with responsibilities for staff relations, staff establishments, labour relations, training and education, and welfare. Mr. Bruce has been associated with the Territorial Army for a long time, joining the Rangers in 1931 and being a Company Commander at the beginning of the war, going out to the Middle East with the Battalion in December, 1940. On the reduction of the Rangers to cadre strength owing to casualties and wastage, he was appointed to the Middle East Supply Centre, G.H.Q., Middle East, becoming Director of Materials with the rank of Colonel, responsible for the programming of all civilian supplies other than food and transport, and the encouragement of local production for all the Middle East countries. He was awarded the O.B.E. and also, for his services in the Territorial Army, has been awarded the Territorial Decoration and Bar, and has been president of the Rangers Regimental Old Comrades' Association since the end of the war. His interests include motoring, travelling and unconventional holidays. He is a keen lawn tennis player.

SIR GEORGE JESSEL will relinquish his Chairmanship of Parkinson & Cowan, Ltd., and his seat on the Board, on December 31. He will be succeeded as Chairman by MR. H. P. BARKER.

MR. W. R. JONES, of Murex Welding Processes, Ltd., Waltham Cross, Herts, has now retired from the position of Area Manager to the company on reaching retiring age. He has held the position of Area Manager for 25 years, and became well known in industrial circles in the Midlands. He was a founder member of the committee of the Institute of Welding, Birmingham branch, and was Chairman in 1938-39 and later again served on the committee. Mr. Jones will be succeeded as Murex Midlands Area Manager by MR. A. T. WILLMOUTH, formerly Area Manager of the East Midlands.

MR. R. F. LANSDOWN, at present Mechanization Engineer in the East Midlands Division, of the National Coal Board, has been appointed Chief Mechanization Engineer in Production Department at National Headquarters. Mr. Lansdown succeeds Mr. I. G. E. Leek, who left the Board's service for a private appointment.

MR. T. P. REAY, Director and Southern Area Manager of Cannon (GA), Ltd., retires from the service of the Company at the end of December. Mr. Reay joined the Company in 1938 and re-started the Southern Area Organization in 1945 which he directed until recently. MR. M. R. SARKIES has been appointed Southern Area Manager of Cannon (GA), Ltd., and Export Manager for the Continent of Europe, and MR. C. I. HOATSON has been appointed Sales Manager of Cannon (GA), Ltd. MR. H. KNIGHT succeeds Mr. Hoatson as Northern Area Manager.

Diary

December 1.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton. 11 a.m.

December 1.—INSTITUTION OF GAS ENGINEERS, NORTH OF ENGLAND SECTION. Joint meeting with Northern Junior Gas Association. 'The Alnick to Rothbury High Pressure Main,' Mr. W. R. Garrett and Mr. E. L. Robson. Demonstration Theatre, Gas Offices, Grainger Street, Newcastle-upon-Tyne. 2.30 p.m.

December 2.—LONDON AND SOUTHERN JUNIORS: Annual Reception and Dance. Caxton Hall, London, S.W.1.

December 2. — INSTITUTE OF FUEL: 'Wales Gas Board—Integration of Fuel Supplies,' E. M. Edwards, W. T. Hird, T. S. Ricketts, S. L. Wright. South Wales Institute of Engineers, Park Place, Cardiff. 6 p.m.

December 3. — WALES AND MON. JUNIORS (WESTERN): Visit to Robert Dempster and Company. Paper. 'Recent Developments in Purification Technique,' E. Aspinall. Bath.

December 3.—SCOTTISH JUNIORS (EASTERN): Joint Meeting with the Western District. 'Integration in the Manchester Group of the North Western Gas Board.' L. S. Crowle. Heriot-Watt College, Edinburgh. 3 p.m.

December 6.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, S.W.1. 10.45 a.m. Consultative Council and District Committees. Alliance Hall, Caxton Street, Westminster, London, S.W.1. 2.30 p.m.

December 7.—SOUTHERN G.C.C.: Town Hall, Bourne Avenue (off The Square), Bournemouth. 11 a.m.

December 7. — INSTITUTE OF FUEL: 'Two-Stage Gas Producer,' P. Clarke, Royal Victoria Hotel, Sheffield. 2.30.

December 7. — INSTITUTE OF FUEL, LONDON: 'Power, Population and Productivity' (1955 Melchett Lecture). Dr. A. Parker, C.B.E., Institution of Civil Engineers, Great George Street, S.W.1. 5 p.m.

December 7.—INSTITUTION OF CHEMICAL ENGINEERS: 'Phenolic Effluent Disposal,' D. A. Hall. The University, Leeds. 7 p.m.

December 8. — CHEMICAL SOCIETY: 'Some Aspects of Research in Scottish Division of the National Coal Board.' Dr. E. A. C. Chamberlain. North British Hotel, Edinburgh. 7.30 p.m.

December 8 and 9.—COMBUSTION ENGINEERING ASSOCIATION: Annual Conference. Palace Hotel, Buxton.

Correspondence

JAMES HARGREAVES

DEAR SIR,

I am seeking information about James Hargreaves, who founded the Liverpool Gas Light Company in 1815. Hargreaves was associated with F. A. Winsor in London in 1807. He was appointed the first Deputy Governor of the Gas Light and Coke Company in 1812 and resigned in December, 1813. I am particularly anxious to learn of Hargreaves' activities between December, 1813, and July, 1815 when he arrived in Liverpool, and also after he left the service of the Liverpool Gas Light Company in August, 1817. It appears probable that he founded other gas undertakings and if any reader formerly associated with any such undertaking could send me information I should be most grateful.

Yours faithfully,
S. A. HARRIS.

North Western Gas Board,
Liverpool Group.

21st AUTUMN RESEARCH MEETING

This report, the first of a series on the Autumn Research Meeting of the Institution of Gas Engineers, reviews the Session devoted to Coke, which took place on November 22 with Mr. Henry F. H. Jones, Deputy Chairman of the Gas Council, presenting the papers.

THE COKE SYMPOSIUM

THERE can be no doubt that the highlight of this year's Institution of Gas Engineers Autumn Research Meeting was the Symposium on Coke (I. Gas E. Publication No. 476), which was by way of being the gas industry's reply to the questions posed in the Beaver Report concerning the need for larger quantities of solid smokeless fuels in the future. In January of this year the Gas Council appointed a panel to investigate any production techniques or processes which would increase the quantity of gas coke available for sale, particularly to domestic consumers, and the members of the panel were H. F. H. Jones (Chairman), W. R. Branson, Dr. J. Burns, J. E. Davis and W. Hodkinson. The work put into the present Symposium and the findings reported make it a most valuable survey of the present gas coke position and its future possibilities. It cannot be too strongly recommended that all those interested in the production and utilization of coke should study the Symposium in detail. Here we propose to give briefly the major points brought out in the papers and in the very spirited discussion which followed the presentation.

Mr. Jones, in presenting the papers, said that the questions which had to be considered were: How much coke is needed to meet the probable demands for solid smokeless fuel in smoke control areas? What kind of coke is needed? How much coke can be released from existing uses on gasworks, and by what means? How much extra coke can be made in existing carbonizing plants and how much extra coal will this need? If new carbonizing plant has to be provided, how much plant capacity will be needed and what will it cost? Can lower-rank coals, such as are often used as house coals, be carbonized with satisfactory technical and economic results? Can high-rank coals be used to make a good domestic coke, even if carbonized in static types of carbonizing plant?

Coke in the Domestic Market

The first paper, 'Coke in the Domestic Market,' written by Mr. Jones himself, contained a broad survey of the production of smokeless fuels, their consumption in the domestic market, and the additional quantities of gas coke which might be made available in that market.

The possibility of releasing coke for sale by using coal gas passed through the producers to heat the settings (discussed by Dr. Burns and Mr. Hodkinson) was regarded by the speaker as a possible means of maintaining coal throughput during short periods of low demand for gas, such as week-ends and bank holidays, especially in industrial areas. However, it did not seem likely to be economic for prolonged periods.

Some of the problems which arose in delivering solid fuel to domestic premises and in transferring coke from other markets to the domestic market were referred to. They are of importance when consideration is given to the extent to which, over a period of years, solid fuel can be expected to hold its own in the domestic market in competition with gas, electricity and oil.

A brief reference was made to the economics of carbonization, and to the importance, if coke production is to be increased, of the carbonization process being competitive on a cost basis with other processes of gas manufacture. It might be said that in the long term the gas industry could make use of the carbonization process only so long as the residual cost of gas made by that process remained competitive with gas produced by other means.

The necessity for a long-term policy was emphasised in the conclusion to this paper. Mr. Jones considered that it would be ruinous, financially, if after new plant was built to produce smokeless fuel insufficient coal was found to be available for carbonization. Similarly, great difficulties would arise if declared calorific values were increased substantially in order to allow increased coke production, and if coal supplies were then curtailed.

Coke Availability and Gas Manufacture

Dr. J. Burns, in hsi paper, 'Factors Affecting Coke Availability in Gas Manufacture,' discussed how the composition and inherent qualities of gasmaking coals affected the production of coke from carbonizing plant for a given gas requirement. He surveyed, quantitatively, the effect of such factors as coal rank and swelling index on coal throughput in the continuous vertical type of carbonizing plant and showed how these factors affected the quantity of coke produced. He also discussed, in a quantitative way, the effect of coal size, and provided a basis on which could be determined the economic suitability of using graded coal or 'run-of-mine' coal.

He spoke further of the effect of gas calorific value on coal throughput and coke output, and with this he coupled a study of the economics of making gas of high or low calorific value. He stressed the great importance to the industry of the coal/coke price ratio and set out one particular example which showed not only the very considerable effect which the price of coke has on the cost per therm of gas but also the comparative effect of operating at high and low gas calorific values for varying coke prices with a fixed price for coal. 'In general, the higher the price of coke in relation to the price of coal the more economic does it become to operate at high calorific value, and one may expect an advantage in favour of high calorific value gas when the coal/coke price ratio is one or less.'

In later paragraphs Dr. Burns considered the effect of benzole extraction and carburetted water gas production on coal usage and coke production; there was included a series of graphs which showed the material relationships between coal, coke, benzole, and carburetting oil. Of particular interest was the discussion on the conditions under which benzole could be replaced by gas oil without any increase in coal usage.

This valuable contribution to the Symposium set out some of the fundamental factors affecting coke production, and presented quantitatively, the alternatives which are available to the gas industry for regulating the production of its principal products and its usage of raw material.

Open-fire Coke from High-rank Coal

J. E. Davis, in his paper, 'Production of Open-fire Coke from High-rank Coal,' emphasized that the Beaver Committee recommended immediate action, using such methods as are

already available for the reduction of air pollution. Gas coke was recommended for use because the Committee believed that adequate supplies of coke could be made available during the next five years to enable a good start to be made in reducing the use of bituminous coal in domestic premises.

Mr. Davis considered the burning properties of coke and the conversion of coal to coke. He underlined the view that if coke is to be the fuel which is to enable a quick start to be made with the clean air policy, use must be made of coke of a kind which can be made in existing plant and from the coal now available. In London there is a substantial proportion of static carbonizing plant, and 83% of the coal carbonized is high-rank coal from the North East coast. He showed that an entirely satisfactory coke could be made from high-rank coal in static carbonizing plant provided that adequate control was exercised over the manufacturing process. He emphasized the necessity for avoiding a demand for unnecessarily high standards of reactivity, and that coke burning grates must be designed to burn coke of the type which can be made available. While underlining the close control of the degree of carbonization which is necessary, he referred also to the necessity for limiting moisture in coke, and for effective size grading. He mentioned the use, by satisfied consumers in South London, of coke made in static carbonizing plant from high-rank coal over a period of 25 years, using properly designed grates, and he believed that it would defeat the clean air policy if the specification for coke or the design of appliances was such as to exclude the large amount of coke which is now made in static carbonizing plant using high-rank coals.

Carrier Gas and Coke Production

In the fourth paper of the Symposium, 'The Application of the "Carrier" Gas Process to the Production of Solid Smokeless Fuel,' W. Hodkinson indicated how the carrier gas process could be applied to increase coke production. The utilization of coal water gas as carrier gas enabled the coke production to be almost doubled when compared with coke production from continuous vertical retorts operated to produce gas at 450 B.Th.U. per cu.ft. under steaming down conditions. This paper also indicated how extra coke could be produced by using coal gas for firing the retort settings, and showed that up to 40% of the heat requirements of the settings could be provided by coal gas firing, thus liberating approximately 1 cwt. of coke for sale per ton of coal.

The application of the carrier gas process to the carbonization of blended coals and slacks was indicated, and the utilization of low-grade coals for the manufacture of smokeless fuel by carbonization of size agglomerates was referred to.

Costs were given to show the effect on coke price of operating under carrier gas conditions with varying gases used as carrier gas, and with settings heated either with coke or with coke and coal gas. It was shown that additional coke produced by partial firing with coal gas necessitated a considerable increase in the selling price of coke to restore the level of gas cost of production, whereas the employment of the carrier gas process using either coke or coal water gas as the carrier gas could have the effect of either reducing the price of gas while maintaining the price level of coke or reducing the price of coke while maintaining the price level of gas.

It was shown that the use of the carrier gas process using coal water gas could effect an increase in coke production of 2.41 x the existing production under steaming-down conditions to a calorific value of 450 B.Th.U. per cu.ft., while giving an increased gas production of 2.16 x that produced under steaming-down conditions, this factor indicating the increase in coke per unit of gas produced when operating under carrier gas conditions.

Low-rank Coals in Continuous Verticals

W. R. Branson and D. Pickering in their paper, 'The Carbonization of Low-rank Coals in Continuous Vertical Retorts,' gave an account of work which has been done on the carbonization of low-rank coals mixed with more strongly caking coals, mixtures being distinguished from blends by the fact that blends of coal normally involved the crushing of the coal to pass a ¼ in. mesh screen, whereas mixtures were not crushed. They concluded that attempts to carbonize these mixtures in continuous vertical retorts did not give very promising results at current prices of coal and coke. On the other hand, the carbonization, alone, of types 802 and 902 coals from the Midland coalfields in size over 1½ in. appeared to be more encouraging. The reactivity of cokes made from these coals might be such that the cokes could be marketed for open fire use after debreezing without further screening. The economics of making coke in this manner had not, so far, been worked out. This paper could be looked upon as an interim report of the work done, and would be supplemented in time by the publication of further results.

Coke Quality and Appliance Performance

In the paper on coke quality, 'Coke Quality and Appliance Performance,' F. A. Burden and F. J. Eaton discussed the preparation of a specification for household coke. This was one of the recommendations of the Beaver Committee, and work had already started in drafting a British Standard. The main consideration here was, what should be the level of quality of household coke? There was already a recommended specification in the Gas Council Coke Quality Report: was this satisfactory? The authors suggested that, ultimately, it is the consumer who decided from the performance obtained from the open fire, boiler or heating stove whether the coke was satisfactory. The first part of the paper therefore dealt with an analysis of coke complaint data in relation to coke quality. For example, Works 'A' quoted in the paper produced a coke which complied with the Gas Council specification, and the complaints of this coke were mainly confined to sizing. Since the sizing analysis of samples taken at works came within the required specification, it was clear that there was a need for a more accurate sampling procedure.

There was now general agreement that coke quality depended on the five factors of sizing, ash including shale, reactivity, moisture and bulk density. Each of these factors was considered separately in relation to appliance performance. On reactivity a colour chart indicated the appearance of open fires, and opinions were sought on the acceptability of the fires illustrated. The authors suggest that there was little difference at peak output even although the cokes vary widely in quality. Further work carried out since the paper was written had thrown up two exceptions to this general rule, and it might well be advisable to record the figure for peak output in a specification for open fire coke. The conclusion reached was that the open fire and the hot water boiler tests could be made the basis of a household coke specification, and that tests on sizing, moisture, reactivity, etc., would then be used only for works control purposes.

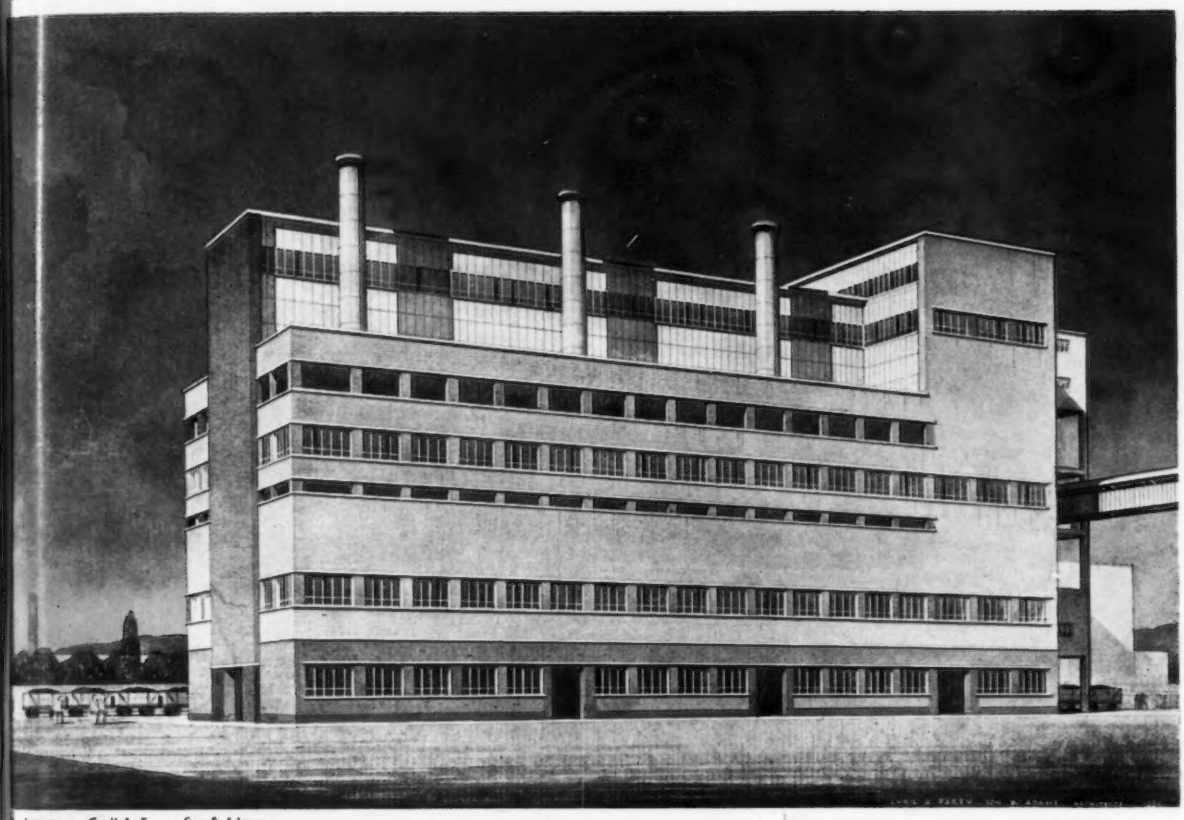
DISCUSSION

As mentioned earlier the discussion which followed the presentation of the Symposium was extremely spirited, probably one of the liveliest which has taken place at an Institution Research Meeting.

Dr. A. Parker (Director of Fuel Research, D.S.I.R.) spoke of the necessity for installing appliances which will burn coke satisfactorily and for persuading householders to change over from coal to coke. In this connection he thought that the consumer would only be satisfied if his coke was reasonably low in ash and of fairly uniform quality. On the subject of cost Dr. Parker said that coke obviously could not be subsidized by undue addition to the price of gas, but he pointed out. coke of reasonable quality could be used with higher thermal efficiency than that ordinarily obtained with coal. He put this added efficiency at approximately 20%, but thought that householders did not fully appreciate this point. In his view there were still many consumers who still thought that coke was 'coal with the goodness taken out of it,' and that there was here an opportunity for re-educating them. Another important point made by Dr. Parker was that of storage. He said that the amount of storage for solid fuel in houses must be increased if serious difficulties in delivery, and thus cost of delivery in the winter, were to be avoided. In this matter architects and builders could assist, and he thought that they might also be pressed to arrange for tiled recesses in dwelling houses to take practically any kind of free standard fire without difficulty.

Scottish Conditions

The next speaker was Mr. E. G. Smith, of Glasgow, and he referred particularly to gasmaking conditions in Scotland. He said, 'There are two problems before us, firstly, how to



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produce maximum coke against any given gas demand, and secondly, can the conditions created by the first be sustained when carbonizing low-rank coals, types 800 and 900. Referring back to Dr. Burns' paper and the emphasis which it contained on the usefulness of high calorific value in making more coke available, he thought that it would be uneconomic and impossible to maintain a calorific value of 500 B.Th.U. with the coals which they were compelled to accept. In concluding what amounted to a brief review of Scottish practice, Mr. Smith said that 'Beyond substitution or use of low rank coal in carburetted water gas plant no additional coke yield had been forecast from Scottish practice.' He thought that efforts in his part of the country to increase coke production might be assisted by increased supplies of coke oven gas.

A Coal Board Point of View

The National Coal Board was represented amongst the speakers in the discussion by Mr. H. D. Greenwood, Assistant Director of Carbonization, who considered not only the manufacture of coke and other solid fuels, but also their utilization. No doubt it was his inside knowledge of the coal position which prompted him to say, 'If we are materially to increase coke production it seems almost inevitable that we shall have to use larger proportions of the lower-rank carbonization coals and to blend a proportion of non-coking coals.' He said that in the National Coal Board they had found that blends of, say, 502-601 rank coals with 802-902 coals would not only give a coke sufficiently strong to be pushed from the coke ovens, but also that the proportion of breeze was not materially increased. Mr. Greenwood thought that instead of leaving volatile matter in the coke as Mr. Davis suggested he might consider the economics of blending a proportion of low-rank coal.

Turning from the production to the utilization side, Mr. Greenwood thought that easy ignition and the time required to give a cheerful fire were very important to the consumer. He also suggested that friability of coke, which had not been mentioned, was also quite significant. As might be expected, this speaker referred to the work which the National Coal Board has in hand in the production of solid smokeless fuels from coals not normally used for carbonization. He said that whereas formerly it was only possible to make carbonized briquettes from certain high-rank coals briquetted with pitch they now hoped to be able to convert a wide range of weakly and non-coking coals into smokeless briquettes. Furthermore, they hoped to increase the production of these coals in due course. Another potential source of reactive coke which Mr. Greenwood mentioned was the carbonization of coal blends at medium temperatures. A highly reactive open grate coke could be made in narrow coke ovens operated at flue temperatures of 800° to 900°C. and, Mr. Greenwood said, they were examining the technical and economic possibilities of this development.

Uses of Different Grades of Coke

A line of thought which nobody else seemed to have pursued was investigated by Mr. S. K. Hawthorn of Birmingham. He was rather surprised that nowhere in the Symposium was there any reference to the relative quantities of the various sizes of coke made, nor to the uses, proper and improper, to which each size is put. A startling fact which he drew out was that of about 17 mill. tons of coke made by the gas industry only 3 mill. tons reached the domestic consumer. Since the domestic consumer requires mainly No. 2 coke for open fires, might it not be possible to arrange that all the coke of this size should be reserved for this market. In Mr. Hawthorn's view this move alone would double the availability of coke to the domestic market. Approximately 3 mill. tons of No. 2 coke was being used for retort heating and for industrial consumers. If industrial consumers could be persuaded to take other forms of fuel than No. 2 coke and if the gas industry went over gradually to mechanical producers, which will take Nos. 3 and 4 grades, the domestic market could be helped to the extent of another 3 mill. tons of No. 2 coke. Although Mr. Hawthorn's suggestions seemed to involve a lot of shuffling about between the gas industry's own use of coke and that of the industrial and domestic consumers, nevertheless there seems to be a great deal of substance in what he said.

Many present at the meeting had little doubt that, in due course, they would hear from the redoubtable Dr. G. Foxwell—nor were they disappointed. Speaking as a member of the Beaver Committee, Dr. Foxwell had many trenchant remarks to make about coke in all its aspects. He said that one of the conclusions reached in the Symposium, and for that matter in the discussion, was that there would have to be an increase in the price of solid smokeless fuel. He did not think that the Beaver Committee would be very much disturbed by that provided that the increase was modest, and, 'when I say modest let me say that the gas industry must not regard this as a "Beaver-sent" opportunity to jump up the price of coke in order to subsidize the price of gas.' Dr. Foxwell continued by remarking that the gas industry is a two fuel industry and he didn't see any reason why it should not be a coke industry rather than a gas industry!

Educating the Public

The present quality of some coke came in for a few hard knocks at this point. Dr. Foxwell thought that there was a suggestion in some of the papers that any coke produced from static retorts from any coal would be satisfactory. His reply to this was, 'Don't you believe it! In many parts of the country coke is regarded as a fuel which no Christian would admit into the house.' He said that the gas industry had not bothered about coke in many parts of the country but had left it to its own devices. 'Now,' he continued, 'you have got not only to produce a good and satisfactory coke, but you have got to show people and explain to them that you have it. You have got to convince people. In other words, you must do a great amount of educational work, and we do look to the gas industry to help us to do that educational work all over the country.'

At the conclusion of his very provocative contribution to the discussion Dr. Foxwell referred to the problem of slum clearance and to the opportunities which this presented to the gas industry. He said that a start was to be made in removing all old-fashioned appliances in the 'black areas' and in replacing them by modern appliances. 'Here,' said Dr. Foxwell, 'is an opportunity (for the gas industry) which will not recur in our generation.' He put it that it was up to the industry, by good salesmanship and easy payments—Government permitting—to ensure that as much of its equipment as possible was installed in these areas.

Coal Preparation

Coal preparation and its effect upon coke quality formed the basis of Dr. Lessing's remarks. He thought that if we wished to see coke as the normal solid fuel in the house it was necessary that it should be clean to handle and that it should leave a minimum of ash. Some 25 years ago trials were carried out in which it was shown quite decisively that intensive cleaning of coal prior to carbonization had great advantages, not only in promoting a cleaner coke but also in assisting the manufacturing process. Dr. Lessing thought the gasworks was not the right place for the preparation of coal, this should be undertaken by the producer, *i.e.*, the National Coal Board. It would, in his view, be a counsel of despair to consider that the Coal Board was unable to remove excessive impurities. 'I have pointed out again and again,' he said, 'that we do not know yet, and the general body of fuel technologists have not yet appreciated, the advantages of separating what we call impurities from the point of view of the eventual uses of the coal.'

A Domestic Consumer's Viewpoint

The point of view of a domestic consumer of coke was put by Mr. Morland Fox, and it was stimulating to hear a consumer's view as against those of the producer. Apparently Mr. Morland Fox uses approximately 12 tons of coke per annum, and was very disturbed this summer to receive over 3 tons of No. 3 coke which revealed upon analysis approximately 20% of ash, which ash contained some 30% of bats and shale. When he took into account the unconsumed carbon in the ash and the efficiency of heating, Mr. Morland Fox reckoned that his coke cost him over £9 a ton, in which case oil became very competitive. At the end of his remarks he suggested that the gas industry should make every effort to produce and sell a good coke, that it would have difficulty in continuing to sell its coke if complaints were prevalent on account of ash content.

Education in the Gas Industry

The 32nd Report of the Gas Education Committee, 1954-55, presented to the AUTUMN RESEARCH MEETING of the INSTITUTION OF GAS ENGINEERS, and a report of the discussion

MR. J. H. DYDE, Chairman of the Gas Education Committee, presenting the Report, said:—

This is the fifth occasion on which I have had the pleasure of introducing the Report of the Gas Education Committee since taking over the Chairmanship from Mr. John Terrace, who you will remember as the architect of many of the original schemes of education and training which served our industry so well and for so long. These five years have been formative years in which we have been endeavouring to meet the rapidly changing needs of the industry.

With regard to the Institution's own professional qualifying examination, the main body of entrants under the new regulations are not expected for two or three years; those who have so far presented themselves for the final examination in gas engineering entered the scheme with a fair measure of exemption from the early years of the course. There were 18 of them this year, an increase on last year, but if our record of those pursuing study at various stages is correct, about 80 are on the way with direct study to our Associate Membership through the examinations set jointly by the Institutions of Civil and Gas Engineers, and a further 300 or so are hoping to achieve the same objective through the Higher National Certificate machinery. Not all the students can be expected to pass right through to the final, but at any rate all are engaged in fundamental training on the right lines.

Sandwich Courses

Last year a good deal of discussion was focused on the subject of sandwich courses. Mr. Teasdale, the Education Officer of the North Western Gas Board, is a keen advocate of this system of training, and the Gas Education Committee is certainly behind him in this respect. He made the plea at this meeting last year that complete exemption from the Associate Membership examination should be granted to students who successfully complete the sandwich course at the Royal Technical College, Salford. This proposal was examined by the Gas Education Committee and the Institution Council, and, subject to the safeguarding conditions as to educational standards enumerated on page 8 of the Report, complete exemption has now been accorded this College.

About 40 students are at present taking this course, and, with the exemption thus given, will not appear in the records of the Institution's Board of Examiners. This sort of development, coupled with the fact that gas boards are recruiting more graduates into the industry, must be taken into account when making comparison with past years of the number of students taking the Institution's examinations.

Further to the subject of sandwich courses, several more colleges have the matter under consideration. The function of the Institution in this connection is quite clear, namely, that it is prepared to advise on and approve such courses from an educational standpoint. It is a major undertaking for any college, particularly in regard to staffing arrangements, to set up such courses, and it is an essential prerequisite to success that there should be a guaranteed number of students extending into the future.

Last year I suggested that four suitably selected colleges for sandwich course operation would serve the entire needs of the industry in higher technological training. I believe now that I may have overstated the case unless individual colleges specialize in respect of 'manufacture' or 'supply' engineering. However, the whole problem is one to which a rational approach should now be made, and the Gas Education Committee has referred the matter to the Gas Council to pursue with the area boards who alone can determine the present and future need of such courses.

Turning now to the full Technological Certificates issued by the City and Guilds of London Institute in 'Supply' and 'Manufacture,' may I recall to you that when we raised the standard of the Associate Membership examination and withdrew the ordinary and higher grade certificates, we introduced these four-year part-time courses in Gas Technology. They were designed to provide an academic standard suited to the requirements of the many supervisors, superintendents and the like—generally known as supervisory grades—that it was felt the industry would need in its development.

Recognition of Certificates

I think the time has now come when we should take stock and ask ourselves whether these courses do in fact match up to the requirements of the industry, whether the industry has actually given sufficient recognition to them, whether, indeed, the Institution within its categories of association should not give the holders of such certificates some recognition.

There has been a pleasing increase in the number taking the certificate in Gas Technology (Manufacture), but at 35 it is still small. The numbers are greater for the (Supply) Certificate, and, as you are aware, a section of this examination forms part of the course of the Certificate in Salesmanship and Consumer Service. The organizational pattern of the industry is changing with what we know as 'supply' being clearly divided into a 'distribution' function and a 'utilization' function, and the question arises whether the time is now appropriate to recognize this trend and provide distinct courses for each function.

While on the subject of change, I would like to report, since going to press, the receipt from the Institution of Civil Engineers of particulars of certain changes in their Associate Membership examination that will become effective from April, 1957. Two subjects, 'Engineering Drawing' and 'Engineering Materials,' hitherto included in final Part II, are now to be regarded as basic subjects and included in Part I. Part I will now be common to the Institutions of Civil, Mechanical and Electrical Engineers, and will also be used by the smaller Institutions, including the Institution of Municipal Engineers and the Marine Engineers, and, of course, ourselves. Your Committee have expressed satisfaction with these proposals which are more in line with the gas industry's requirements than the joint scheme at present in operation.

One of the main reasons for my mentioning the matter at this stage is that the necessary alterations will have to be made to our own Education Regulations, and if we are also to introduce a greater measure of specialisation into our main subject of 'gas engineering' at Associate Membership level to give separate recognition to 'manufacture,' 'distribution' and 'utilization,' it would be an advantage for the changes to be effected simultaneously.

This brings me to my final point. You will note that we propose after a lapse of three years to hold another Gas Education Conference at which principals of technical colleges, teachers of gas subjects, representatives of the Ministry of Education and the City and Guilds of London Institute, will meet the educational committee of the Institution for general discussion of the Institution's educational activities. The education officers or other appropriate representatives of the area boards will also be invited.

Discussion on Report

The discussion was opened by Mr. R. N. Bruce (Staff Controller, North Thames Gas Board), who, fearing that the industry might not get sufficient recruits from the universities to meet the demand for the higher grades of employment, emphasized the significance and importance of the sandwich courses. Congratulating those area boards who had taken the lead in this matter, he thought it should be examined by the

industry as a whole, first of all as a method of recruitment. He believed that one area board could not continue to run a sandwich course for the minimum of, say, 16 persons year by year the smallest unit that a technical college could manage. With such a unit the college would be able to employ a full-time teacher without calling upon 'hard-worked and indispensable engineers' to undertake teaching work during the day. It would, therefore, be necessary for neighbouring areas to collaborate on a geographical basis in these schemes.

American Education Organizations

Dr. Haffner reported observations of the educational organizations of the American gas industry made during the visit of the British delegation to the recent conference of the International Gas Union in New York. It had been his privilege to present the Report submitted by the Institution on recent developments of gas education in member countries. The information supplied by the American gas industry referred to the Institute of Gas Technology, a short course in gas technology at North Carolina State College, and the Utility Management Workshop at Columbia University. This, however, represented only a modest proportion of the effort which the Americans put into education and training, all of which has been fully reviewed in the 1952 Productivity Team Report.

Dr. Haffner went on: 'The Training Department of the East Ohio Gas Company was visited and an inspection made of the facilities provided for training in the Customer Service Department where, in the past year, there were 37 five-day courses with an average of 11 men in a course as well as nine shorter courses in which 69 men were trained. The instructors are drawn from senior supervisors who spent at least six months in the department giving instruction and demonstrations. Special courses are held for the Home Service Department to provide instruction in the fundamentals of combustion and demonstrations of operation of burner controls. There are courses for telephone girls to evaluate customers' complaints, short courses for the entire department in customer relations and telephone techniques, and training sessions for general officer employees to acquaint them with fittings and store operation. Finally, there are evening sessions for training for master plumber organizations.'

Dr. Haffner said it was noted in a review of operating problems by H. A. Fitzgerald of Washington, D.C., that peak load plants did not easily attract desirable young recruits. The limited operation of such plants did not permit of much training and there were long periods of shut-down when the operator was transferred to substitute occupation, during which time he might become forgetful of the finer details of the plant. Mock runs with dry cycles and even real runs before the plant was actually needed did much to develop confidence and establish plant reliability. With the growing importance of peak load shaving plants there was considered to be a real need for a central school to train young men in gas plant practice and operation.

At the Institute of Gas Technology at Chicago they had the interesting experience of meeting the administrative and teaching staffs and of hearing from the director, Mr. Pettyjohn, of their educational and research programme. Their funds were derived from the gas industry by ten-year commitments of about 60 associate member gas companies contributing a maximum of 5,000 dollars a year, and by companies making contributions for scholarships. From the P.A.R. Fund (Promotion, Advertising and Research) of the American Gas Association, was received 377,000 dollars in 1954. All these funds were used to educate gas utility executives in one of four phases:

(1) The gas technology option programme in which undergraduates taking chemical or mechanized engineering degree courses in the Illinois Institute of Technology may take a 12-weeks summer term course in principles of gas technology; scholarships and fellowships are available.

(2) Training of men who have already graduated in chemistry, physics, chemical or mechanical or petroleum engineering and leading up to a Master's or Doctor's degree. There were six in 1954.

(3) Refresher courses organized in the summer in four three-weeks periods and one or more of these may be taken by men from the gas industry. There were 51 enrolments in 1954.

(4) Home study courses for those unable to attend the Institute. The course is devoted to natural gas. It is reported that 850 have enrolled for it. To an individual it costs 75 dollars, but there are reduced rates for multiple enrolments and still lower rates if a group leader assumes responsibility for the guidance and supplementary instruction of his group.

The Institute was generously equipped with modern research tools, good library facilities, and in the former gas producer plant building at the neighbouring Cranford Station of the Peoples Gas Light and Coke Company, there had been installed pilot plant to the value of almost 1 mill. dollars. The pilot plants included a pressure coal gasifier, fluid gasification unit, a thermal cracker, auto-hydrogenation and methanation catalytic units and a Hall plant under pressure.

Museum presentation of the gas industry was interesting to compare, continued Dr. Haffner. He was justifiably proud of the Gas Gallery in South Kensington, and it was interesting to see a new Gas Gallery in the Museum of Science and Industry at Chicago. It was of similar size to the British Gas Gallery and was provided by the Peoples Gas Light and Coke Company as its centenary celebration. The historical aspect was greatly subdued, modernity and romance were accentuated. The models showed pipelines from Texas gas production systems, and the distribution system under the streets of Chicago. One working model showed a heat treatment process. And finally, as the visitor was leaving the section, there was a modern all-gas kitchen, which was likely to cause discontent to the female members of any party visiting the exhibition. They could go straight away to the showrooms and order yesterday's cooker and hope that they were satisfied with it tomorrow!

Training in Salesmanship

Mr. W. T. Lane addressed himself to training in salesmanship. He described the methods in use in the South Western Area where a two-week residential sales training course had been established at Bristol following short-time sales training at Divisional level. All salesmen, irrespective of status, are required to take this course, 12 at a time for comparable status. 'We have sought the co-operation of the College of Commerce at Bristol and have the assistance of their specialist lecturers in Sales Psychology, Personality, Speech-recording exercises and Report-writing.' His conclusion was that the recognition of the Institution's certificate in Gas Salesmanship and Consumer Service, as a practical qualification, must contribute to the attainment of a higher standard of salesmanship and create enthusiasm for the production of essential new ideas.

IRAQ'S FIRST GOVERNMENT-OWNED REFINERY OPENED

King Feisal earlier this week opened Iraq's first Government-owned oil refinery, at Daura, on the River Tigris, three miles south of Baghdad. The refinery has cost more than £11 mill. to construct, with the additional cost of the pipeline bringing crude oil from the Iraq Petroleum Company's junction at Baiji. The crude oil comes from the Kirkuk fields. The capacity of the refinery was estimated at 24,000 barrels of crude oil a day, but experience in running-in the plant before the official opening shows it is capable of handling 27,000 barrels. This can be increased to 30,000 barrels a day by minor additions of equipment.

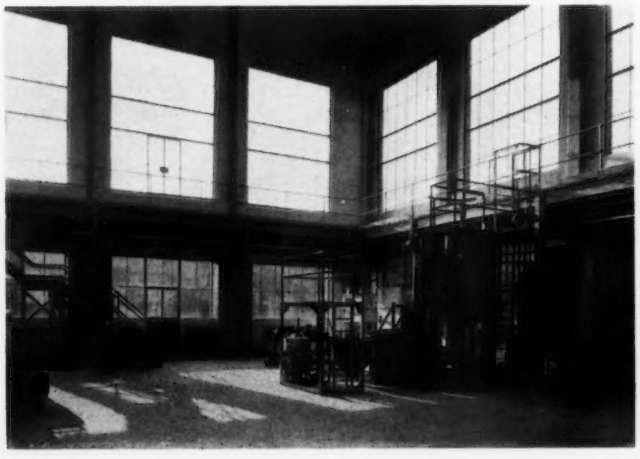
In the building of the refinery some 20,000 tons of equipment has been imported, and of this about 80% has been supplied by British manufacturers. The American firm of Kelloggs (through a Middle East subsidiary) undertook the design, supply of equipment, and erection. The British firm of William Press & Son, Ltd., did the work on the foundations and the civil engineering involved. The consultants were Sir Alexander Gibb and Partners. The pipeline, designed by Costain-John Brown, Ltd., was built by the Iraq Petroleum Company at cost. The refinery was built by Iraq labour, the work being supervised by American and British engineers and technicians.

General exterior of the new laboratories of the London Research Station.

New Research Laboratories at Fulham

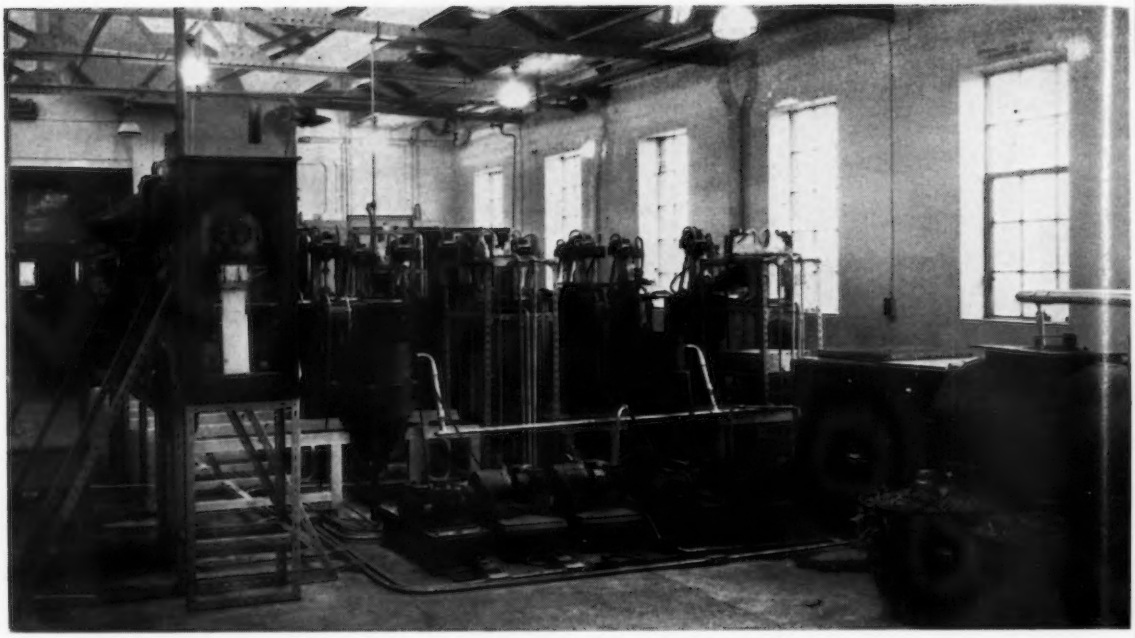
In our issue of November 23, we described on page 537 the official ceremony at the opening of the Gas Council's new laboratories at the London Research Station, Fulham. We give here a description of the three new laboratories which constitute the extensions concerned, and which practically double the research station's floor area.

Left and below, two views of No. 5 laboratory for large pilot plants, especially for very tall units.



History of the Research Station

The London Research Station was originally set up by the Gas Light and Coke Company in 1924, on the top floor of their old building in Horseferry Road, but in 1928 new laboratories were built at the Fulham gasworks. This choice of site has meant that research could be carried out in close proximity to the actual gas production. Dr. Hollings who had been appointed Chief Gas Chemist in 1925, was appointed Controller of Research in 1946. A small single storey extension was added in 1948 and quarters provided temporarily on the wharf for pilot plant experiments. After nationalisation Dr.



This laboratory, No. 6, at the Gas Council's new building at Fulham, is being used for small pilot plant experiments on gasworks effluents.

Hollings was made first Director of the station. He retired in 1952, to be succeeded by the present Director, Dr. R. H. Griffith, who will now have a staff of a hundred. In the past ten years pilot plant experiments in relation to chemical engineering have considerably increased, which is the principal reason for the construction of the new laboratory buildings.

Pilot Plants

For large pilot plants, and especially for units of considerable height such as gas washers and fractionating columns or equipment using fluidized solids, the No. 5 laboratory has been specifically designed. This laboratory is the largest of the three having a floor area of 3,000 sq.ft. Access is provided to the first floor and workshop, and loads up to two tons can be handled by a full-span crane. Typical of the work in progress is the study of the life of refractory materials used in retorts. In the search for a solution to the problem of flaking, carbon deposits are being produced in refractory bricks, made of silica and other materials, which are heated in a furnace and subjected t treatment with coal gas. The natur of the carbon penetration is being studied in relation to temperature and pressure and type of refractory material. The manufacture of catalyst for organi sulphur removal is also being undertaken in this laboratory. The catalys is manufactured by impregnating chin clay pellets with nickel sulphate, and then heating them in a stream of coa gas to form nickel subsulphide.

Smaller pilot plant experiments such as work on the biological oxidation o gasworks effluents is carried out in No 6 laboratory. Liquid effluents from gas works containing phenolic substances and thiocyanates which are poisonous to plant and animal life are being de stroyed by biological oxidation. Suit able micro-organisms have been culti vated, and method for supplying ade quate quantities of oxygen to the liquo have been studied. In the pilot plant the many variables which affect th process are being investigated.

View of the general laboratory which is particularly concerned with full-scale tests on gasmaking plant.

General Research

The general laboratory, No. 7, i mainly concerned with the full-scal tests on gasmaking plant which depen on the accurate measurement and analy sis of all raw materials and product and on the continuous observation o temperature and other operating con ditions. Methods of automatic p sampling in intermittent processes hav been developed and in the determinati of the water content of gases for th calculation of steam balances, many im provements have been made. Th laboratory is the base of Fulham mobile research team who travel abo the North Thames Gas Board's area carry out on-the-spot tests on new modified installations.

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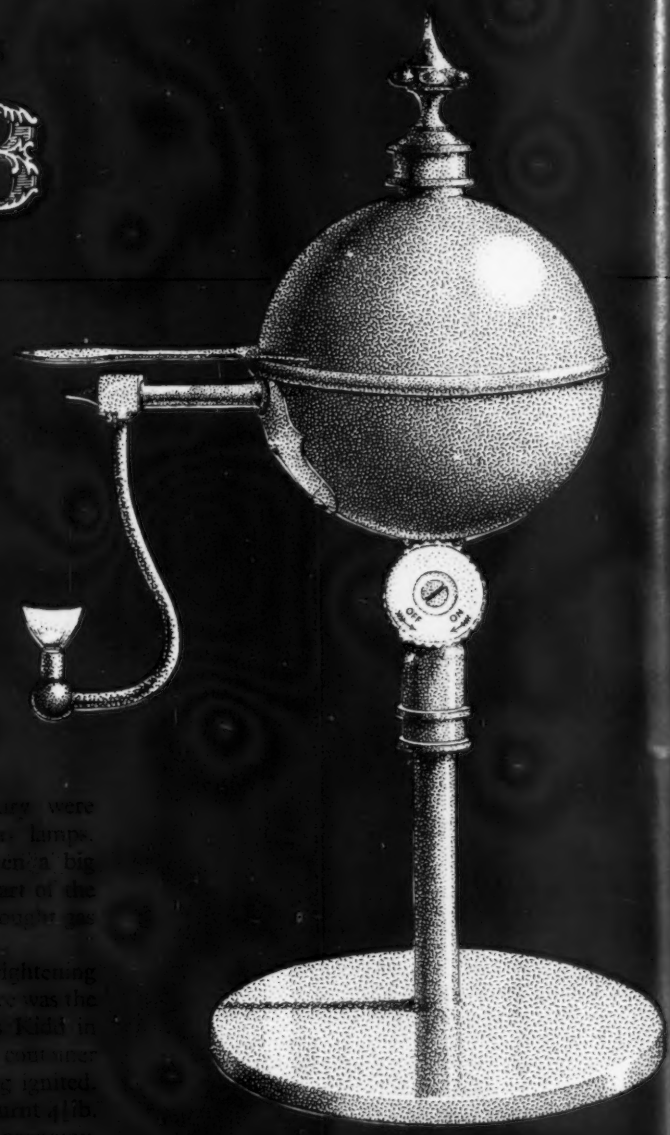
THE PROGRESS OF GAS

1878



Engineers throughout the 19th century were striving to get more light from gas lamps. William Sugg's steatite burner had been a big advance, and to Sugg must go a great part of the credit for steady improvements which brought gas lighting into many homes.

Other men tried other methods for brightening the homes. The strange device shown here was the 'Albo-Carbon' lamp, invented by James Kidd in 1878. Gas passed through a ground container filled with naphthalene balls before being ignited. For every 1000 cu. ft. of gas, the lamp burnt 4½lb. of naphthalene, costing 1/6. This was no economy, but Kidd claimed that it boosted an ordinary flat burner from ten to thirty candle power.

Along more conventional lines, the gas burner had developed from the earliest "rat tail" to the "sector" of 1820 and "cockscomb" of nine "rat tails". Clegg's argand burner (1809) was largely superseded by the "batswing" in 1816. In 1855 the "Bunsen" was first seen: it doubled the light of the "batswing" and, though economical, remained the standard type of

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Chemical Laboratories in the Gas Industry*

By L. G. TOWNSEND, M.Sc., M.Inst.Gas E., F.R.I.C., M.Inst.F.†

Part 2

THE examination of coal and coke accounts for a large proportion of the exertions of the Central Laboratory and since practically all samples are received as gross or semi-gross samples, two full-time samplers are employed to prepare the samples for the laboratory and to carry out screening and shatter tests and the like. The system for dealing with samples is similar to that followed in the main laboratory although added precautions to prevent mistakes are taken, in that additional labels are always included in sample bins and these are passed to the chemist in charge as they are booked in. The sampling of coal at the works is carried out to a programme based on statistical principles and is designed to provide results necessary to estimate the quality of particular types of coal.

Individual samples are taken according to B.S. 1017. The sampling rate is based on the variability of the particular coal being sampled and each type of coal is regarded as an entity. This means that the emphasis is on coal types rather than individual batches and the information obtained serves as a basis for negotiations affecting the basic price of the coal. This arrangement may conflict with the requirements of the Station Engineer who is more concerned with the samples of coals which are finding their way daily into the retort house. With this in mind, therefore, samples of coal elevated to the retort house are also examined. A continuous record of coal sampling is maintained at each works. A certain amount of coal testing is also carried out for other groups. In general coal screening, tests, where considered necessary, are carried out at the works. All coal samples received are examined for ash, moisture, volatile matter, calorific value, swelling number and sulphur and, from time to time, Gray King assays are carried out on the more commonly received coals or on completely new ones. Facilities are also available for the determination of nitrogen and chlorine, and ultimate analysis and ash fusion determinations are carried out on selected samples. The complete analysis of coal ash whenever it is necessary is passed to the analytical group in the main laboratory, but this is only called for in the case of special investigations. Of recent years many coals have been examined for the presence of so-called 'flying shale' by sink-and-float methods and some considerable information has been compiled, which has enabled certain coals to be regarded with disfavour, and in one or two cases, rejected.

With the increasing interest being taken in smokeless fuels, coke testing is now a task of some magnitude and in the case of coke the samples are received at the Central Laboratory in sacks as sampled. This means that all screening tests on domestic coke are carried out by the same operators who have no individual interest in the result. A large number of fire tests are also carried out by the method described in the Gas Council's publication on coke quality. All such cokes are also examined for their C.A.B. value, for proximate analysis, sulphur, calorific value and, on occasion, volatile therms. The bulk density of coke is also carried out regularly and periodic samples are submitted for their shatter index. Occasional tests are carried out for phosphorus and arsenic as the market requires. In the case of coke, also, certain tests are carried out for other groups. It should be mentioned that all the works laboratories except the smallest, have facilities for screening coke and a large number of such tests are carried out by the works and the results transmitted to the Central Laboratory. These results cover coke other than domestic size and periodic tests on run-of-retort coke are carried out. In addition to this routine work, investigations into the variability of samples for C.A.B. test and the possibility of using a scaled-up version of this test are going on at the present time. In the case of all the results obtained in the coal and coke laboratory, facilities are available for card indexing all the results as they come forward and reference can be quickly made to individual coals or coke from a particular works. From time to time the amount of work passing through the Central Laboratory is studied and some of the figures are of interest here. During an average quarter about 800 proximate analyses of coal or coke are carried out along with 45 Gray-King assays and 100 C.A.B. determinations, together with sundry ash and dust samples. In the main laboratory 150 spent oxides and 12 new oxides are examined, together with about 800 tars for water content, 100 complete gas analyses, 100 effluent samples, 80 concentrated liquors, nine benzoles and sundry other samples including germanium-bearing flue dusts.

In addition to the routine work already described, a small group of two or three assistants is maintained for dealing with investigational work of a very varied nature. This group, for example, carried out all the oxide activity tests as distinct from the normal oxide analysis. At the same time, they are also concerned with the development of new methods of analysis for the works and central laboratories.

In addition to these activities the Central Laboratory, in conjunction with the works laboratories, is responsible for the collection and despatch of all germanium-bearing flue dust. The amounts of this material coming forward are often small and spasmodic and the current arrangement is for all this material to be forwarded to the Central Laboratory whence it is despatched, after examination, to the refiners. The amount of this material handled is not large, but significant increases have resulted from the new arrangements.

The Instrument Section

The Instrument Section of the Central Laboratory organization is a relatively new department, although a Senior Physicist engaged on development work has existed since the laboratory was opened at Wavertree. At the present time this section is in the charge of the Senior Instrument Engineer. It is surprising to find that at the present time there are no less than 1,300 instruments on the production side of the group and this list does not include items such as pressure gauges and mercury in glass thermometers. Clearly such a large number of instruments of a rather varied character calls for considerable maintenance if they are to perform the task for which they were installed. It is only relatively recently that this question of planned maintenance has been seriously tackled and the present scheme is believed to meet normal requirements. Each of the two larger works, Garston and Linacre, has a full-time Instrument Service Engineer, and Southport is treated in the same manner. Athol Street, Wavertree and Prescot instruments, which are not nearly as numerous individually, are serviced from the central instrument workshop at Wavertree. The service engineers at the works are provided with a bench and simple tools and use the works laboratories as their headquarters. Serious defects which are beyond the facilities available at the works, are dealt with by the central instrument section at Wavertree.

There are facilities for checking and calibrating instruments and the apparatus available includes a workshop pattern potentiometer, two decade resistance boxes, an insulation tester, instrument resistance references, movement balancing box, cubic foot bottle, complete escapement meter testing rig, Wheatstone bridge box, Avometer, potentiometric lamp and pyrometer test kit, deadweight pressure gauge tester, standard temperature references, portable A.C. potentiometer, standard reference optical and thermo-electric pyrometers.

The central instrument section also maintains a small stock of the commoner instruments, particularly temperature and pressure recorders and differential pressure recorders, which can be used as replacements when works instruments come in for repair. A complete card index record of every instrument is maintained and it is possible to see at a glance the incidence

* From the paper, 'Some Aspects of Scientific Control in the Gas Industry', presented to the Manchester and District Section of the Institution of Gas Engineers on October 27.

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of repairs to individual instruments or those of particular types. This register has proved of inestimable value in standardizing on particular instruments. At the same time, an effort has been made to reduce as far as possible, the number of ranges used on the works, so that a minimum number of spares need be carried. It is immediately evident that some kind of centralized instrument control is essential to avoid the stocking of instruments at individual works and to ensure that new instruments are not obtained while a spare is available at another works. It would appear from the information so far available that a group of the size we are discussing here is quite appropriate to this type of organization. The central workshop maintains a small stock of spare parts as well as of individual instruments and it is not usual for the works to be deprived of an essential instrument for any length of time. Considerable advantages are also attainable by the standardization of items such as thermocouples and sheaths, and there would seem to be a case for some standardization in fixing methods for instruments of the same duty. The instrument section is also responsible for maintaining a batch of instruments suitable for carrying out works investigations and plant tests. In this category come sampling devices, pyrometers of the suction type, and temperature recorders of various ranges. The maintenance of the stock of certified apparatus for gas calorimetry, including thermometers, is also handled entirely by the Central Laboratory. The central instrument section is responsible for the setting up of new instruments and in cases where the instrument is of a completely new type, a trial is usually carried out at Wavertree. Recent examples of this include paramagnetic oxygen and industrial *p*H recorders.

It might appear from the description already given that the Central Laboratory is preoccupied with chemical testing rather than with the operation of works plant, but this is by no means the case. The Central Laboratory is supervized by an Assistant Chief Chemist, but there is also a further Assistant Chief Chemist with a chemical engineering bias and of equal status who is almost entirely concerned with works matters. He is available continuously for the investigation of works problems and spends most of his time on the works. Instances of matters which have come within his purview are the determination of the efficiency of dust collection on mechanical producers, the determination of fuel consumption of carbonizing installations, the investigation of water-in-tar difficulties, the investigation of cooling tower corrosion. Such matters are dealt with in collaboration with the works staff and, if necessary, additional staff from the Central Laboratory may be made available. There is no doubt that when investigations into carbonizing plant are being made the facilities now available at the Central Laboratory are of great value and results are obtained quite rapidly when the samples are transported by the laboratory van.

Reporting of Results and Information

A great deal has been said of the manner of carrying out tests, but very little of the manner in which the information obtained is transmitted expeditiously to the people interested. Routine chemical examination of samples sent in from the works laboratories are covered by a laboratory report which is made out in triplicate three times a week or as often as the results warrant. If results are required urgently this is arranged between the works chemist and the chemist in charge at Central Laboratory, and it is possible, in an emergency, to obtain results the same day. The sheets in triplicate allow a copy to be sent to the Station Engineer and the Chemist concerned and all the results reported are subject to the scrutiny of the Group Leader and the Chief Chemist or his assistant. In addition to the information disseminated in this way, further periodic summaries are prepared. Each month a summary of coal analyses, coke analyses, effluent analyses and gas analyses are prepared and copies sent to all who are interested. It is also the duty of the chemical department to prepare weekly and monthly summaries of works results. Each works laboratory forwards weekly to the Chief Chemist a sheet showing all screening tests carried out on coke and by Wednesday of each week, at the latest, a summary of the works operating details and chemical tests. From these weekly chemical data sheets the weekly summary for the Group is prepared and this is available by Friday. Copies are sent to all the works engineers and chemists and to the administrative staff who are actively interested.

All results obtained in this way are agreed with the records department where appropriate. When the works chemist is responsible for the operation of certain items of plant it is usual for him to prepare a monthly summary of the results obtained and it is from these that certain investigations spring. A copy of this summary is given to the Station Engineer and the Chief Chemist. The works chemist also provides his Station Engineer with the daily report mentioned previously. The whole of the information discussed in this section is continuously available to the Production Engineer. In addition to reports already mentioned, yearly reports on subjects such as water treatment, dry purification, liquid purification and so on are prepared and usually these are accompanied with suggestions and recommendations for improved working.

Library and Information

For many years the old Liverpool Gas Company maintained a Central Library dealing with matters mainly connected with the gas industry, and it had always been the practice for the Chief Chemist to take care of the section of this library which was concerned exclusively with purely chemical and physical subjects. This arrangement has continued to the present time and a small branch library, an offshoot from the main library at Group Headquarters, exists in the Central Laboratory at Wavertree. The Group Librarian maintains the records covering the contents of this library and he can arrange for any of its individual items to be borrowed by any of the Group personnel on request. It is to be expected that nearly all requests for books or papers come from the chemical or engineering staff. This arrangement works extremely well since this technical section of the library is on the site where it is of greatest value. A reference card index is maintained at Wavertree to cover all the main technical branches of the industry and this is kept up-to-date mainly by means of 'Fuel Abstracts' and the 'Journal of Applied Chemistry Abstracts.' This card index is also available to anyone who wishes to consult it and its scope is wide enough to cover almost any technical subjects connected with the gas industry.

The contents of the Central Laboratory library consist of a relatively small number of textbooks covering various fields of chemical analysis, chemical engineering, fuel technology, instruments and the like. These textbooks are kept up-to-date by occasional purchases of new volumes as they are published. The body of the library comprizes bound volumes of periodicals which are regularly taken.

In addition to the bound volumes there is also a very comprehensive stock of technical papers and articles of interest to the gas industry, which forms a section of the card index reference system. There is also available a wide selection of British Standards and Patent Specifications. The facilities available also include a certain amount of translating from French and German journals, and current Patent Specifications are covered by the Patents Abstracts Journal. It is believed that the system described is not too elaborate but satisfies the requirements of the Group when used in conjunction with the Science Library and the libraries of the technical and academic institutions.

Recruitment of Staff

It must be admitted that the recruitment of staff for the chemical department has always been something of a preoccupation, in that there is very keen competition for individuals even with the most elementary chemical training in the Merseyside area. It is practically impossible to obtain chemists of degree standard and it is fortunate that the present system does not call for large numbers of qualified individuals. It is believed that, providing existing salary standards relative to other industries are maintained, adequate qualified men to maintain the system will be obtained from among the existing staff, as they qualify, and this aspect has been continually in mind. It is occasionally possible for a promising Higher National Certificate standard student to be released for full time intensive courses for A.R.I.C. lasting for nine months and this is probably the best means of obtaining qualified chemists with gasworks experience. Perhaps one serious criticism of the system outlined in this paper is that the work is apt to be stereotyped, but this can be overcome in a laboratory of this size by arranging for interchange of staff between the various groups and also between the Central Laboratory and

the works. There is also no reason at all why individual groups should not carry out investigations connected with work they do and this is, in fact, encouraged where time allows. It has been possible to utilize female staff for some of the routine operations in the Central Laboratory, and in this kind of work they are found reliable. Occasionally they are employed on the works, though this is unusual. It must be admitted, however, that it is rare for female staff to have any but the most limited aspirations and although the opportunity is there, any desire for responsibility is rarely evident. On no occasion has any female laboratory assistant reached Higher National Certificate standard and the Ordinary Certificate is only rarely achieved.

With the case of the Instrument Section the position is no better since the competition for instrument engineers of all kinds is very acute. Again reliance must be placed in individuals who have been trained by part-time study with the Group and the conditions of service with the Board are considered at least as favourable as elsewhere. Full advantage is always taken of training courses arranged by individual firms of instrument makers which are particularly valuable. Bearing in mind the limited range of instruments on the normal gasworks this system works well. There must always be a certain amount of wastage in the chemical department, partly on account of transfer to other departments in addition to normal wastage and it has been found that this amounts to about 6% per annum. This may be higher than in other departments in the gas industry on account of the versatility of chemically-trained individuals, but it is not believed to be any higher than in chemical industry generally. It is expected that the minimum qualification aimed at by members of the staff will be a Higher National Certificate in Chemistry but there is encouragement to proceed to a further Higher National Certificate in Chemical Engineering or to Associateship of the Royal Institute of Chemistry. There is no doubt that chemical staff trained in a laboratory of the type described who have had the opportunity to work in the works central laboratory become extremely versatile and have no desire to leave an industry which presents them with many opportunities.

Conclusions

Many of the methods described in this paper have now been in operation for some years and there is no doubt that the system provides a service which has now become indispensable. Its main justification lies in the value placed on such a department, firstly by Area and Group level management and secondly by the management at Station Engineer level which derives the most immediate benefit from the assistance provided. The value of some kind of central chemical organization to implement items of Gas Council policy, for example, coal conservation or the quality of gas or coke production, is immediately evident. Perhaps one of the most notable developments of recent years has been the full appreciation of the value of safety measures in industry from both a moral and financial aspect. Skilled technical assistance is frequently called for to maintain this modern standard of safety. There is no doubt that the standard of instrumentation in the gas industry is, from some points of view, below that desirable for most efficient operation, and further development is visualized in the future. This is also accentuated by the tendency toward centralized gas manufacture in large units where instrumentation becomes of great importance.

DISCUSSION

Mr. E. T. Pickering (Area Chief Chemist, West Midlands Gas Board) said that in considering the kind of scientific organization required to perform its functions efficiently in an area, it must be recognized that such factors as size, number and distribution of undertakings, had to be taken into account, but in his opinion a structure which comprised works, group or divisional, and area laboratories, would in the long run be found to provide the most efficient service in the majority of areas. The guiding principle should be to direct the energies of the staff to the productive processes and to ensure that they were not cluttered up with more than the minimum amount of bench work. In general terms the function of a group central laboratory should be confined to carrying out work of local interest only to the undertakings it served. He believed that a group central laboratory should only be established in the vicinity of a number of works of large size, as for example, in the case at Liverpool. In these circumstances there was an adequate volume and variety of work to justify the cost of apparatus and equipment required. Work appropriate to a group laboratory would obviously exclude much that was done at the Liverpool central laboratory and his remarks therefore, pre-supposed the existence of an area laboratory, whose duties Mr. Pickering set out in detail. He agreed that there was no reason why a chemist or physicist of suitable ability should not become a successful engineer, but he did not think it satisfactory that a chemist should almost of necessity look to becoming an engineer if he was to secure a status and remuneration commensurate with his ability. Chemists would generally agree that they did not take the direct responsibility that rested on their opposite numbers of the engineering staffs, and they did not expect the same remuneration, but he thought they could fairly expect to have similar status; they might be invited to attend meetings at which their opposite numbers on the engineering side were present. The area laboratory offered a suitable prospect for able chemists and physicists to pursue their chosen profession in their own right. Costly modern plants capable of operating with very high efficiency would not give of their best unless controlled by skilled technicians and operators, directed by men of the highest administrative and scientific ability, whether they were engineers, chemists or physicists.

Col. W. M. Carr said he did not consider himself old-fashioned because he always regarded himself as a gas engineer and as a chemical engineer. Chemical knowledge was necessary in the training of a gas engineer and some part of his training must be devoted to laboratory work, but he saw some danger in the new system of chemical control. It was vital that the chemist should have considerable experience of the ultimate result of his work, particularly when it came to the conservation of fuel. There was a danger of the overlapping efforts of a multiplication of specialists whose knowledge was not sufficiently broad based to achieve the results desired.

Dr. L. G. Burrage (Laboratory Administrator, I.C.I. Ltd.) confined his observations to the management side of Mr. Townsend's paper, the physical layout of laboratories. Regarding laboratory personnel, he remarked that provided selection was made of persons of the right qualities, he found that up to the age of 23 a first class girl straight from school was superior in research work to a first class boy. Girls matured mentally faster than boys and they worked to a high standard of responsibility. Get girls interested in their jobs and they became first class assistants.

Mr. J. Castle (General Manager, Wirral Group, N.W.G.B.) said that Mr. Townsend had presented an account of a system of scientific control based upon experience similar to Group working, spread over a much longer period than the life of present Groups. He found it difficult to see what value there was in the examination and testing of such items as refractory materials, paint and lubricants. Mr. Townsend had referred to these as important raw materials, but for Mr. Castle would have referred to them as finished products, for the quality of which could be relied upon the status of the firms from whom they were acquired. There was more opportunity to-day than ever before to employ scientific control to assess the relative merits of different types of plant and equipment within the Group in order to enable the most suitable plant for any set of circumstances to be operated at any one time, and thereafter to see that such plants were operated continuously at the very highest level of efficiency. This called not only for first class routine control, but also for special investigation of individual plants and problems as they arose from time to time. He thought the idea of a small team available for special investigation operating from a Central Laboratory was excellent. From Mr. Townsend's account of the duties of the Works chemical staff it would appear that they were responsible for some of the work which was performed elsewhere by technical assistants. Although it was indicated that the principal chemist was eligible for promotion on the engineering side, he doubted whether the system provided the same opportunity for gaining the right experience as did that of the technical assistant system.

Mr. C. Cooper (W. C. Holmes & Co., Ltd.) said that the paper should help to illustrate the fact that the boundary between the professional engineer and the professional chemist was being progressively lowered as time goes on. In fact, not until the layman appreciated the importance of work which

could be done in both the engineering and chemical fields, was there much probability that a change would be seen.

Mr. D. W. Kaye (Chief Chemist, Manchester Group N.W.G.B.) said it was the rule in the Manchester group that the works principal chemist and his staff come under the immediate control of the station engineer who was 'king of his own palace.' He had found this system to work exceedingly well and it in no way embarrassed or hampered the group chief chemist in his endeavour to co-ordinate the chemical control within the group. Mr. Kaye felt that such a system was far superior to a state of dual control where it might suit a member of the staff to pay homage to the station engineer one day and the group chief chemist the next. Scientific control must be an integral part of the works management. The central laboratory should not only be an analytical and investigational laboratory, but should possess staff well versed in works procedure who could go on to the works to investigate difficulties or throw in their weight in times of stress.

Author's Reply

Mr. Townsend said that he agreed wholeheartedly with most of the views expressed by Mr. Pickering, although he was still of the opinion that what might be suitable in one area would not necessarily provide the best organization for another. With regard to coal testing, he had made it clear in the paper that this could be approached from two quite different angles, and the remarks made by Mr. Pickering were pertinent to the area as distinct from the group approach. It was interesting to note that in the West Midlands Board the chemical staff was responsible for all calorimetry, including the design of calorimeter rooms. Exactly the same held at Liverpool, and a new calorimeter room was at that moment being installed at Linacre. There had always been some interest in the possibility of establishing testing teams, but at group level they could not be fully occupied, and the solution was to recruit such teams from the laboratory staff as and when the need arose. He entirely agreed with Mr. Pickering's remarks regarding the status of the chemist, but he said it should be remembered that the most highly paid posts must always have regard to the responsibility carried, and that more posts existed in the ranks of management than in the specialist field, at any rate in the gas industry. He thought it would be generally agreed that the prime duty of a station engineer lay in the field of management rather than as a specialist engineer, and in this respect personality played a considerable part. The details of the methods used in the West Midlands Board for providing technical information to those immediately concerned were of great interest. It was also of the greatest importance that the whole of the chemical staff should be kept fully informed of the part they were playing in the organization and the reasons behind the work they were carrying out.

Mr. Townsend said that the remarks of Colonel Carr were very much to the point. He stressed, however, that there was a great deal to be said for the laboratory as a training ground, particularly when the chemist played his full part in the operation of the works, as at Liverpool. There were many examples of chemists who had entered the field of management and had thus contributed substantially to the progress of the industry. It was noteworthy that many chemical engineers, particularly in the gas industry, had started their careers as chemists.

Replying to Mr. Castle's remarks, Mr. Townsend said he would agree that in these days of specialization a great deal had to be taken for granted when purchasing certain materials used by the gas industry. On the other hand, very considerable sums of money were spent on refractory materials and some system of quality control would seem to be desirable. while he did not think that the industry would allow its eyes to be taken off the main issue, which was the manufacture of gas efficiently, there must be some machinery for the assessment of whether specifications, which had often been arrived at after a great deal of experience, were complied with. He subscribed to Mr. Castle's remarks with regard to the efficient operation and testing of plant, but he did not entirely agree that the technical assistant method of training was essentially different from that outlined in the paper. Once again he stressed the value of the chemical approach.

He said he was very glad to have had the presence of Mr. Charles Cooper to support some of the points which he had made in the paper. It was, of course, quite true that the dividing line between the engineer and the chemist was rapidly diminishing.

Mr. Townsend said he was delighted to have had the benefit of Dr. Burrage's remarks on the details of laboratory layout and management, on which he was an accepted authority. His experiences with the engagement of staff were somewhat happier than those of Mr. Townsend, but a great deal depended on the level at which recruitment was solicited. That might be the explanation of the fact that he had found girls who had progressed to posts of high responsibility. Certainly there were not the opportunities for such posts in the gas industry on the scale presented by the concern which Dr. Burrage represents. Many of the criticisms made by Dr. Burrage in such a helpful manner were of interest to all who had control of laboratories.

Mr. Townsend said he would agree with Mr. Kaye that the method of control advocated in the paper was the only one which worked completely satisfactorily, but a great deal depended on the staff concerned. He did not agree that the works laboratories could divide their work into two parts, one type of work being carried out in the morning and another in the afternoon. Coal analysis was best carried out centrally for many reasons.

In conclusion, Mr. Townsend thanked all those who had joined in the discussion, which, he said, had been of great value to all who were concerned in chemical control.

CHAIRMEN'S TECHNICAL REPORT

The Chairmen's Technical Committee of the Institution of Gas Engineers meets from time to time to consider and co-ordinate the current and proposed future activities of the standing technical committees of the Institution and of *ad hoc* panels appointed for specific purposes. Their Report for 1954-55, presented at the 21st Autumn Research Meeting (*I.G.E. Com. No.* 472) includes, in summarized form, an account of the work of the various committees and also, as supplements, recommendations made by them and approved by the Council. In addition, short notes on the work of the Institution Gas Research Fellow and of the Seventh Arthur Duckham Research Fellow are included.

The Eighth Arthur Duckham Research Fellowship has been awarded to Mr. D. Fitzgerald, M.A., B.Sc., who will undertake work for a period of one year on the composition and/or decomposition of coal, in the Central Laboratories of the Dutch State Mines, under the direction of Dr. D. W. van Krevelen. The Institution considers it a great privilege to have a Fellow working under Dr. van Krevelen and very much appreciates the collaboration it has received from the Dutch State Mines.

Close liaison has been maintained by the several committees of the Institution with appropriate government departments, including the Ministry of Fuel and Power, Ministry of Labour and National Service, Ministry of Transport, Ministry of Health, Ministry of Housing and Local Government, Ministry of Supply and the Department of Scientific and Industrial Research. Similarly, co-operation with kindred bodies, notably the British Standards Institution, the Parliamentary and Scientific Committee, and the Joint Committee on Materials and their Testing, has continued throughout the year.

In last year's Report (*I.G.E. Com. No.* 452) reference was made to the appointment of three specialist panels to consider at the request of the Gas Council, the collection and collation of information relating to the distribution, utilization and reforming of natural gas and methane. These panels, under the chairmanship of Mr. G. E. Currier, O.B.E., Mr. J. E. Davis, O.B.E., and Mr. J. H. Dyde, M.Sc., respectively, completed their work in the Spring of 1955 and a combined Report together with a comprehensive document entitled 'Supplementary Information on Reforming,' was submitted to the Gas Council in May, 1955. The Gas Council has decided to publish the Report (without the supplement) as a separate document. Copies of the supplement are available in the library of The Institution of Gas Engineers.

Another panel appointed by the Institution, at the request of the Gas Council, to consider, in collaboration with representatives from the Society of British Gas Industries, a revision of the Standard Conditions of Contract has also completed its work and the agreed revision has been submitted to the Gas Council and to the Society of British Gas Industries for approval.

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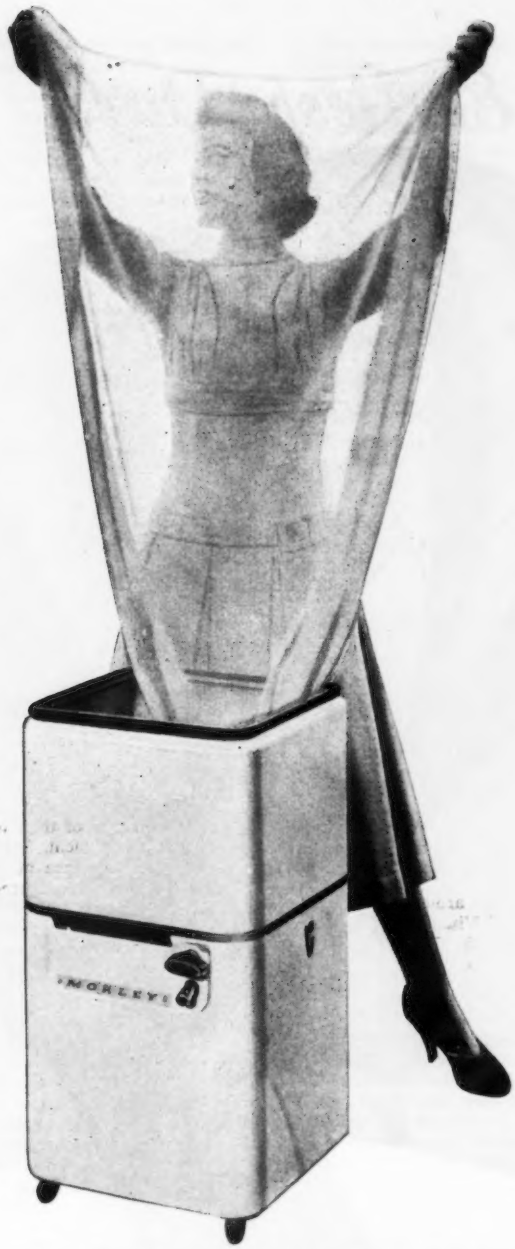

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Autumn Research Luncheon

The 21st Autumn Research Meeting Luncheon of the Institution of Gas Engineers was held at the Savoy Hotel, London, on November 22.

THE President, Mr. W. K. Hutchison, C.B.E., proposed the toast of the guests and extended an inclusive welcome. He mentioned the election to Honorary Membership of Sir Robert Robinson, Member of the Gas Council Advisory Committee on Research, and said Sir Robert's services to gas industry research were well known to, and highly appreciated by, those who had sat with him on the Committee since its inception in 1950. Others mentioned by Mr. Hutchison were: Sir Harold Smith, Chairman of the Gas Council, Mr. H. F. H. Jones, Deputy Chairman, and other members of the Gas Council, Sir George Nelson, President of the Institution of Electrical Engineers, and their own Mr. A. G. Higgins, who had had the honour that year of being elected President of the Illuminating Engineering Society.

Russian Visitors

Extending a welcome to foreign delegates and visitors, Mr. Hutchison included M. Nerot, President of the French Gas Association, and M. Touwaide, Secretary-General of the International Gas Union. At the last minute they had heard of the visit of a delegation of Russian technicians from allied industries in the U.S.S.R. They were very pleased to welcome Mr. Alexandre Chelkov, Director of the General Bureau of the Coke Industry, Ministry of Iron and Steel, and his five colleagues. He expressed the hope that this might lead to a fruitful interchange of information and, perhaps, an invitation to reciprocate their visit.

From the Government Departments he welcomed Mr. Spencer, Chief Scientist, Ministry of Fuel and Power, and Mr. Francis, Under-Secretary of the Gas Division, supported by Mr. J. S. Smith, of that Division, and Sir Ben Lockspeiser, Secretary of the Department of Scientific and Industrial Research.

The keen interest which scientific matters aroused in Parliament was recognized by the presence of Viscount Waverley, President of the Parliamentary and Scientific Committee.

Links with other fuel industries were represented by the presence of Mr. Eccles, Deputy Chairman of the Central Electricity Authority, Mr. J. W. Pattinson, Managing Director of the British Petroleum Company, and finally, Sir Hubert Houldsworth, Chairman of the National Coal Board.

Cost of Research

Previously, Mr. Hutchison said the annual reports of the Gas Council had told of the research which was being directed by the industry towards the many problems which surrounded it. Measured only in terms of money, the cost had risen each year and, according to their last report, the Council was responsible for expenditure of £290,000 per annum, to which might be added the £550,000 spent by the area boards on development and other technical work. Even this took no account of the great efforts of the manufacturers of plant and equipment.

The week before, said Mr. Hutchison, he had the honour of representing the Institution at the formal opening of an important extension of the Fulham Laboratories of the London Research Centre, and no doubt they should soon be seeing the inauguration of the new laboratories at Solihull of the Midlands Research Station of the Gas Council. The Gas Council's Research Scholarship Scheme was now in its third year, and 15 holders of those scholarships were engaged on research sponsored by the Gas Council on subjects selected by the holders and approved by the Council.

Mr. Hutchison said he felt that this obvious recognition of the importance of research must be encouraging to those who were engaged on carrying out the work and an incentive to others to join the industry and take part in the search for new and better methods of making and using gas.

Referring to the 'long standing connection between the Institution and the University of Leeds,' the President said he was glad to learn from Sir Charles Morris, the Vice-Chancellor of the University, that the Fuel Science Department, which was to occupy the first part of the great north block of buildings, was past the planning stage and well on its way, subject to capital commitments and restrictions, to being ordered.

The Gas Council, together with a number of firms engaged on the contracting side of the industry, had contributed towards the cost of these buildings. This would, he hoped, perpetuate the link which had existed for almost 50 years between the industry and the University. In proposing the toast, coupled with the name of Sir Charles Morris, he would like to feel that they were sending to Leeds that day a message of thanks for all they had done for the industry in the past, and their good wishes for the future.

Sir Charles, in response, said the Government had, through the Grants Committee, put at their disposal a considerable capital sum which had enabled them to go ahead with buildings and facilities for research and teaching at the university level connected with the fuel sciences, to go ahead with developments which even three or four years ago they did not really think they should be able to achieve for ten years or possibly even 15 years.

The industry, the Institution and the universities were living in extremely exciting times. It was very difficult to say what were going to be the most spectacular and significant scientific advances in 20 or 25 years' time.

'A Disastrous Thing'

Sir Charles continued: 'The most disastrous thing of all—I am sure that our Russian and European friends would bear this out—would be that we should produce people so trained to the ideas which you and I have today that they would be prepared to face the problems of today instead of prepared to face the problems of their time.'

Sitting in detachment, said Sir Charles, he was greatly impressed by the absence of the problem of communication within the world of the sciences and the applied sciences. One could not live in the universities from day to day without seeing the enormous nourishment that the various applied sciences and the sciences drew from one another. That was partly due to the sensible organization of the universities, but it was chiefly due to the natural instinctive knowledge of the scientists and applied scientists that they were members one of another and that if they were to face a future which they could not predict, they must advance along a whole front and must have an integral approach to the problems.

They could proudly say that within the right rôle of science and applied science there was a closeness of touch, of living together and of inspiration, a closeness of idea and imagination, which was, of course, absolutely vital, not only to the advancement of knowledge and the increasing of the human power to live comfortably and profitably in this universe, but also indeed necessary to the continuance of civilization.

'I hope that my fellow guests will forgive me for having taken this opportunity to say a word as a representative of the universities. I am very greatly honoured in having been allowed to stand on my feet and speak to you at this very remarkable gathering. On behalf of the guests, I thank you for your very kind hospitality, and I would finish with a special word of thanks from myself and my own university.'

Mr. W. K. Tate, Immediate Past-President, proposing the toast of 'Our President and Chairman,' thanked Mr. Hutchison for the opportunity he had given for them to meet together in such pleasant and congenial circumstances. Mr. Hutchison bore a very heavy burden, both as President of the Institution and as Chairman of the South Eastern Gas Board, and he brought to both offices great ability, great personality, and a very nice humour. If his reputation needed making it would have been very well made following his leadership of the British delegation to the International Gas Union meetings in New York. It was no secret that a lot of the benefit able to be derived from the papers that were read from all over the world came from the participation of the British members in the discussions, and he could assure them that behind that participation lay much persuasion and stimulation on the part of their President.

Mr. Hutchison responded.

BEGWACO METERS

★

Wales and Mon. Juniors see Precision and Mass Production at Farnworth Factory

A section of the modern automatic machine shop.

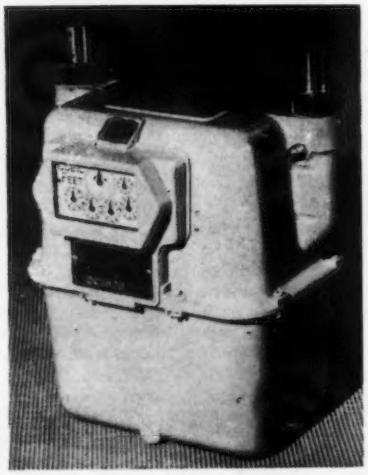
MEMBERS of the Wales and Monmouth Junior Gas Association (North Wales Section) visited the Farnworth factory of Begwaco Meters, Ltd., to see how the most up-to-date engineering techniques have been applied to the manufacture of modern gas meters. Begwaco, who claim the distinction of being the first to develop die-cast meters in Great Britain, commenced full scale production in 1949.

As the development of pressure die-casting machines, together with foundry methods, progressed in this country it became possible to produce castings to a degree of accuracy previously thought not possible and uneconomical to attempt. Begwaco were, therefore, quick to take advantage of the developments in this specialized field and incorporated many precision castings, as they became available, in the construction and design of the 'Flomaster' D.1./200 cu.ft. per hour domestic meter, which has been continually improved from its original design by the Company keeping pace with modern engineering principles.

The Departments

The members of the Association visited, first, the stamping press shop where various types of 'presses' are expertly handled, mostly by female operators. Here, two completely automatic machines stamp out stainless steel bearing bushes which are fitted to all bearing points of the valves and diaphragm linkages and also to the gearbox bearings.

Next, the fascinating automatic shop, where the whole floor space is devoted to the further preparation of many items for assembly in the meter. Many visitors to Begwaco find this section interesting because the automatic machines, having been prepared and set for a particular job, continue to produce—from metal bar, etc.—finished components ready for assembly, without further adjustments or supervision. Although there is continuous inspection of finished parts, the labour force actually needed for these machines is remarkably small. Some larger machines aroused great interest—they are capable of handling five lengths of the bar and of completing many operations automatically on each bar to produce the required articles.



The Begwaco 'Bantam.'

The Juniors were then escorted to the 'case shop' where a multitude of drilling and tapping operations are carried out on the aluminium silicon alloy castings which form the outer case of the meter. It was noted here that the operations were carefully 'jigged' to reduce the human element and the possibility of faulty work. In fact, the firm later claimed that, 'This policy prevails throughout the entire factory. *Nothing is left to chance.*'

Passing through the 'machine shop' where gear cutting, boss threading and many other operations are seen, a brief visit was made to the diaphragm leather impregnating equipment. The impregnation of the leathers is carried out by vacuum and pressure methods so that they may remain supple throughout their life. Here, too, was seen a degreasing and washing plant which removes all traces of swarf and oil which are inseparable from machining operations.

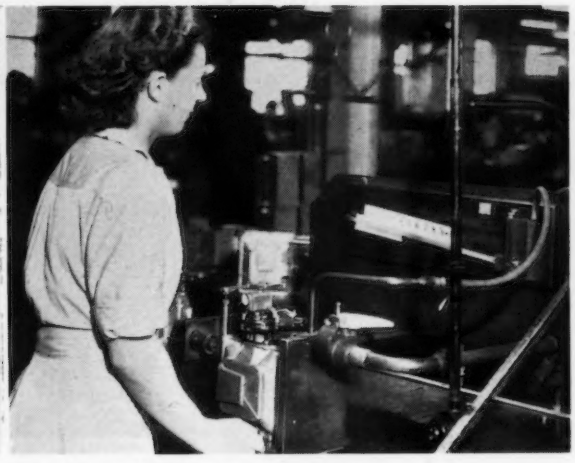
Considerable interest was shown in the overhead conveyor, which transports the castings through a pre-heating infra-red tunnel, prior to their being sprayed with stove enamel. The castings then go on through another infra-red tunnel to stove the enamel. Although giving a high quality finish it was pointed out that this is only a primary paint coat.

In the precision grinding and drilling department the greatest attraction was the machines used to face the joint, now used in the Begwaco meter, to a high degree of flatness.

Assembly

Having seen the majority of the preparatory work on the meter case and parts the Juniors were ready to watch the meter being assembled. This is done on two main assembly floors by female operators and all units and sub-units of assembly are produced on continuous conveyor belt systems. First, the assembly of pre-payment mechanisms, the extreme simplicity of design was noted, together with the rigidity achieved by the use of the alloy castings in the construction. One important feature of the prepayment mechanism is that the gearing is all enclosed in a grease filled die-cast housing. The final stage of the assembly of the mechanism was seen at the end of the conveyor line where final checking and inspection take

Close-up of meter unit assembly conveyor.



Mechanical and physical inspection of a meter unit.

place. In this department was also seen the assembly of gear boxes (again a pressure die-casting and also filled with special grease) and indices of all types for registration of gas for all parts of the world.

On the final assembly floor, where the meters are completely assembled and tested prior to test and stamping by the Ministry of Fuel and Power, female operators are assisted by conveyor line methods. First operation of the final assembly is the fitting of the diaphragm leathers into the positive measuring chambers. When fitted the leathers showed no signs of puckers to the visitors.

The measuring unit is completed by the fitting of main gasway, valve plate, valve covers, gear box, etc., which are all precision manufactured components and completely interchangeable. The testing carried out by Begwaco on these measuring chambers is comprehensive and, Begwaco say, 'Is most essential if we are to maintain the high standard of accuracy to pass our final test.'

The measuring unit fully assembled is thoroughly tested before being installed in the case at badged capacity of 200 cu.ft. per hour for any excessive mechanical friction and the amount of oscillation of the outlet pressure. It is then tested for accuracy of registration at 200 cu.ft. per hour and 20 cu.ft. per hour when the variation at these two rates of flow must not exceed 1% in total from true registration. Having passed these tests the measuring unit is installed in its outer case of the two-machined face castings.

Testing

Tests are now made for soundness and these are carried out first, at 9 in. mercury (4½ lb. per sq. in.) and, secondly, at 6 in. water gauge. Having been proved tight the meter is now tested for accuracy of registration at badged capacity. The limits accepted by Begwaco are much closer than those necessary for the Ministry of Fuel and Power. The final test made is one which is rapidly becoming vitally important to the gas industry. It is the test for 'accurate registration' at 2 cu.ft. per hour, when meters must register at this rate within the tolerances of +3% and −2%. This test is increasing in its value because of the vast numbers of appliances fitted with pilot burners, etc., giving a consumption of 1½-3 cu.ft. per hour 24 hours per day.

Having been stamped by the Ministry, the final paint finish is applied to the primary 'baked on' coat, thus giving additional protection and a pleasing appearance.

In addition to seeing the 'Flomaster' meter manufactured, the visitors were also shown the Company's industrial 1,200 cu.ft. per hour meter. This product consists of a die-cast precision built measuring unit on similar lines to the domestic meter, but which is installed in a heavy steel welded case with a 'bolted on' top giving easy access to the measuring unit itself for servicing and checking. All bearing points on the moving parts are fitted with self-lubricating bushes and as the valves contain colloidal graphite no lubricating maintenance is necessary. In general, this is an ideal meter to form the basis for multiple installations to meet high loads.

The visitors were shown the Company's latest precision-manufactured meter, the new Begwaco 'Bantam,' only recently advertised. This meter is constructed in much the same manner as the 'Flomaster,' but has a horizontal machined face joint as opposed to the vertical type. While somewhat less in overall dimensions the width from centre to centre of unions is identical to D.1 sizes and the meter can, therefore, be used to replace any meter of D.1 dimensions without any serious modification to the service pipes.

The meter has a badged capacity of 150 cu.ft. per hour and is capable of considerable overload.

Mr. E. Butterworth, Managing Director of the Company, welcomed the Juniors at lunch. The visitors were also entertained to tea.

Right: One of three sub-assembly conveyors.

BRITISH EMPIRE MEDALLISTS

At the presentation, L. *to* R. *Messrs. H. S. Reynolds, W. J. Wright, L. J. Lee, H. S. Davies, R. J. W. Johnson and S. Littlewood.*

On Friday last six gas workers received British Empire Medals from the Minister of Fuel and Power for their long service to the gas industry. A seventh recipient was prevented by illness from attending the presentation which took place at Lancaster House in London. Over 280 years' service to the industry was represented by the seven medallists, two of whom have 50 years each to their credit. Among those who received medals was, Mr. R. J. W. Johnson, engineering superintendent of the Reading gasworks, Southern Gas Board who started with a firm of gas plant manufacturers in 1904, and who is the veteran in years of service. The others were Mr. W. J. Wright, shift foreman at the Poplar gasworks, of the North Thames Gas Board with 50 years' service; Mr. S. Littlewood, foreman meter collector of the East Midlands Gas Board; Mr. H. S. Reynolds, distribution foreman of the North Eastern Gas Board; Mr. L. J. Lee, general works and district foreman, South Eastern Gas Board; and Mr. H. S. Davies, grid mains supervisor, Wales Gas Board. Mr. C. R. Hill, who was unable to attend, is charging machine driver of the South Western Gas Board, and has a long record of faithful service, losing only three weeks' illness in 37 years.

After the ceremony, the medallists, their wives and relatives were entertained by the Gas Council at Gow's Restaurant and afterwards attended first house of the Crazy Gang show at the Victoria Palace. Sir Harold and Lady Smith joined the party at Gow's where Sir Harold, in a short speech, paid tribute to the medallists and their fine record of service.

North West Reduces Administrative Groups

The North Western Gas Board announces that its Fylde and Preston Groups are to be amalgamated under one General Manager as from January 1, 1956, thus reducing the total number of administrative Groups in its area from eleven to ten. The new Group, which will be responsible for the supply of gas to 141,750 consumers, will be called the West Lancashire Group, and Mr. A. K. Collinge, General Manager of the Preston Group, has been appointed its General Manager. This development follows the appointment of Mr. C. H. Leach, General Manager of the Liverpool Group, as Chairman of the Southern Gas Board and the appointment of Mr. J. G. O. Drake, General Manager of the Fylde Group, to succeed him at Liverpool.

The final stage in the transfer of The A.P.V. Company Ltd., to their new works at Crawley, Sussex, will be completed towards the end of December when the administrative, sales, technical and drawing office staff move into the new block of offices. The laboratories moved during November. From December 24 all communications should be addressed to The A.P.V. Company Ltd., Manor Royal, Crawley, Sussex, Tel. Crawley 1360, except those for the Chemical Engineering Department which will be accommodated, together with the Company's London Office, at an address which will be announced later.

The Monte Carlo, Monaco, gasworks are to be demolished. Gas will in future be piped from Nice.

Midland Juniors Visit Nechells 'B' Power Station

Thirty members of the Midland Junior Gas Association visited the Nechells 'B' power station on November 17. Mr. S. C. Crathorn, the President, led this visit to what must be one of the most up-to-date power stations in the country. On arrival the party was divided into small groups each with a guide, and 2½ hours were spent seeing how our 'competitors' handle the huge load problems of electricity generation.

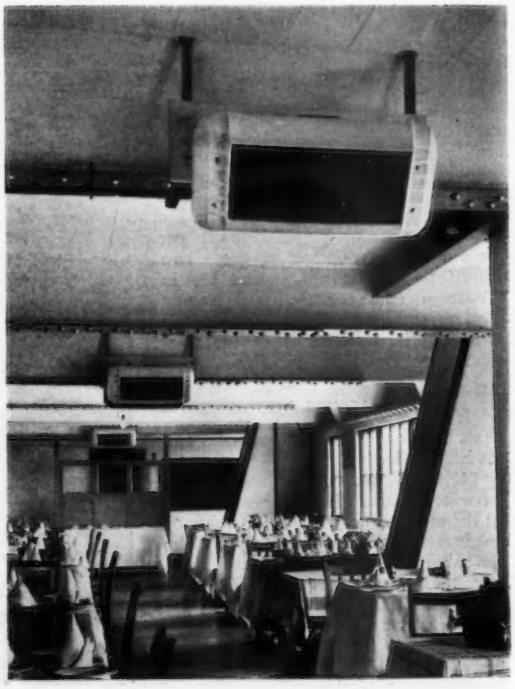
At the conclusion members were entertained to tea, and an opportunity was given for questions, following which the President, Mr. S. C. Crathorn, proposed a very hearty vote of thanks to the Central Electricity Authority for permission to make the visit and for the facilities granted. The visit was repeated on November 24, when a further 30 members took part.

The fourth British Plastics Exhibition and Convention—occupying more than double its previous amount of floor space—will be held in the Grand Hall, Olympia, London, from July 10 to 20, 1957.

GAS-FIRED SPACE HEATERS AT EPSOM

Gas-fired infra-red space heaters by Thomas De La Rue & Co., Ltd., have been installed in the restaurants and bars of the Grandstand at Epsom racecourse. The installation of these heaters was decided upon after a long search by Mr. J. D. Watts, Clerk of the Course at Epsom, and Mr. Hill, Clerk of Works for an economical means of heating.

There were many difficulties attached to heating the restaurant especially the fact that it is only used for a comparatively few number of days in a year. Gas was chosen because of its merits in heavily moisture-laden atmosphere.



Russians Tour West Midlands

A party of six Russian fuel technologists arrived in Britain on November 21, for a five day tour of gas industry installations. The following day they visited Fulham gasworks, attended the luncheon of the Institution of Gas Engineers at the Savoy Hotel, and in the afternoon they saw the Gas Council's Watson House Centre. The visit is also referred to in 'Editorial Comment.'

The Russians spent Wednesday in the West Midlands Gas Board's area, where they visited the Swan Village Works at Birmingham, the Etruria Gasworks at Stoke-on-Trent and the catalytic oil plant in Stafford. They were accompanied on their tour by Mr. Diamond, Chairman of the Board.

At the end of the day Mr. Diamond commented that they were technically very well equipped and were familiar with gasworks processes. They were interested in the standard of maintenance at our gasworks and were evidently attracted by the idea of the tower purifiers and spent a lot of time examining in detail how the operations of dry purification was carried out by this means. They described the works at Etruria as being, 'the best maintained and the cleanest they had seen in Europe'.

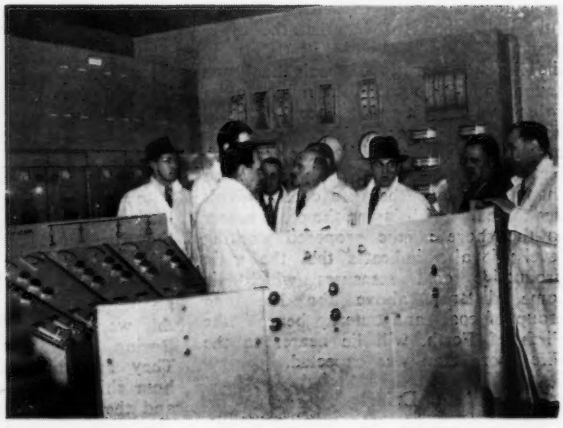
The visitors described the pipe-line for conveying natural gas from the other side of the Urals to Moscow at a pressure of 55 atmospheres. Quantities of natural gas had been found in Russia, but they were inconveniently placed, at long distances from the big cities.

They said they had a high pressure gasification plant producing town gas in the vicinity of Moscow and also a large catalytic oil gas plant at Odessa using aluminium or some derivatives of it as a catalyst. Of their visit to Watson House centre on Tuesday Mr. Diamond said, 'That visit left a deep impression on them and they were of the opinion that British gas appliances were better than anything they had seen'.

Above: *The Russian party at Etruria Works. L. to R. Mr. S. Terehov, Mr. J. E. Stanier (Divisional General Manager, N. Staffs. Division), Mr. A. Chelkov (leader of the party), Mr. G. Le B. Diamond (Chairman of the Board), Mr. J. E. Wakeford (Divisional General Manager, Birmingham Division), Mr. P. Zarovni, Mr. A. Alexandrov, the interpreter, Mr. P. Skafa, and Mr. Evseev.*

Right: *Two of the Russians examine turbo-generators in the power house at Swan Village Works.*

Below: *Mr. Wakeford and Mr. Diamond with three of the Russians are seen on a gantry at Swan Village Works, inspecting arrangements for dealing with spent oxide.*



Left: *Mr. Stanier explains some plant flow diagrams at the catalytic oil gas plant in Stafford.* Right: *Mr. F. W. Foulds (Engineer and Works Manager) explains the power house control room at Swan Village Works.*

ARRIVAL OF FIRST SHIPLOAD OF GAS COAL

While awaiting completion of Central Works I.o.W., of the Southern Gas Board, the coal handling plant is put into operation for the distribution of coal by road transport to the other stations on the Island. The concreted coal yard and ramp, shown here—capacity 10,000 tons—was completed by Mears Bros. of Southampton between August 11 and October 28, in 68 working days.

Drilling for Coal at Sea

The world's first off-shore borehole for proving undersea reserves of coal is now almost complete. The National Coal Board's sea-boring tower was launched from St. David's Harbour, Inverkeithing, on May 22, 1955, towed down the Firth of Forth by Admiralty tugs and grounded at a point about 1¼ miles off the new Seafield Colliery, near Kirkcaldy, Fife. With the success of the borehole the next stage will be to bring back the pontoons, refloat the tower, and put it down about a mile further out to sea for proving the main productive coal measures. It is hoped this will be possible in the next two months, provided the weather is suitable.

The experiment sought a method of drilling for coal at sea in much the same way as the operation is performed on land, save that the drilling rods were to be enclosed in a guide tube which carried them from the platform of the boring tower, through the silts and sands of the seabed, down to rockhead.

The first stage of this new venture, which involved extending the information available about the undersea measures, has been extremely successful: it has been proved that the tower designed for this purpose is satisfactory; the limestone group of coals has been sought and proved; and much other valuable information has been obtained about the undersea strata. The first borehole has shown that the carboniferous rocks dip more steeply out to sea than they do at the Fife coast. This has the effect of bringing the coals nearer to the shore at the proposed working levels; it also indicates that the main productive coal measures which lie some distance above the limestone group of coals and outcrop beneath the Firth of Forth, will lie nearer to the Fife shore than was expected.

Drilling

When the tower was lowered to the seabed, it was found that it had been established half a degree from the vertical; it was, however, possible to drill satisfactorily within this tolerance. The first week aboard was spent in checking the equipment installed, such as generators, water distillation plant, and the system of radio communication with the shore base in Kirkcaldy Harbour. The guide tube was then lowered to its fullest extent into the seabed and a 12 in. casing inserted to seal off the silt and seawater. A start was made on May 29, the difficult operation of drilling through the running sands and silts was completed in the second week in June, and the casing was cemented into the solid rock at a depth of 210 ft. from the platform. After the first part of the borehole was prepared by chisel and rotary roller-bit drilling, the diamond crown was fitted and coring began. Owing to the good weather throughout the summer, the borehole has gone down at the rate of 130 ft. a week, which is comparable with the best speeds achieved in deep boreholes on land.

The Index Limestone, which is the marker band for the top of the Limestone series, was reached on October 1, 1955, at a depth of 2,340 ft., and coring continued; the Cardenden Smithy seams were met at 2,397 ft., the Little Splint and Rough coals at 2,560 ft., the Main and Jerseys at 2,574 ft., the Swallow Drum at 2,628 ft., and the Lochgelly Splint at 2,687 ft. A sheet of igneous rock intruded into the strata between 2,710 and 2,770 ft. increased the interval between the Lochgelly Splint and the Five Foot coal which was cut at 2,914 ft.

The last core will be brought up from about 3,100 ft. The men engaged on this work are employed by the Foraky Boring and Shaft Sinking Co., Ltd. They are volunteers, and work a 12 hour shift continuously for three weeks, and then have a week ashore. Nearly all the present crew are from Fleetwood, Lancashire and Nottinghamshire.

Emergency Plans Criticized

Complaints about the Scottish Gas Board's emergency plans for night-time in Paisley were instanced at a fatal accident inquiry in the town on November 23. A gas inspector told of the complaints he had made to the management about the emergency plans. The inquiry was into the death of two aged sisters, who died from the effects of coal gas which escaped from a pipe outside their house at 9, Douglas St., Paisley, on October 1.

The district inspector, Mr. Thomas White Napier, said that there were no emergency arrangements for inspectors after they went off duty at 5 p.m. The Gas Board had installed a phone in his home and he was often called out after hours. Examined by a solicitor, for relatives of the dead women, Mr. Napier said that although he always went out when called after 5 p.m., he didn't feel he was obliged to stay at home to receive emergency calls.

'Does that mean the people at the gasworks might have to phone half a dozen people before getting someone in an emergency?'—'Yes. They might get no one.' When asked what he did when he received a call about the smell of gas, Mr. Napier replied that he had 'changed into his working clothes, had a cup of tea and then walked to Douglas St., taking about an hour from receipt of call.' Distribution Engineer Mr. W. A. Green said he concluded that the gas pipe, installed in 1949, had been fractured by a subsidence.

Gas Main Explosion

The explosion of a gas main in the front room of a terrace house in Tenter Street, Rotherham, on November 21, almost wrecked the building, rocked the whole street, caused damage by blast to other houses, and injured six people, including two men of the East Midlands Gas Board who were working at the house at the time. The three people admitted to hospital were the 69-year-old tenant, Alfred Oakley, and his wife, aged 70, as well as William Burton, aged 24, a Gas Board worker, of East Crescent, Sunnyside, near Rotherham. The other three—Sidney Buffey, aged 22, the other Gas Board worker, and two neighbours—Mrs. Lily Marsh, aged 66, and Mrs. Lena Rice, aged 61—were allowed to go home after treatment. At the house where the explosion occurred, the front door and all the front-room windows were blown out into the street, furniture was flung against a wall, and three other doors were wrenched from their hinges.

An unusual number of long-service certificates was presented by Commander Philip W. Kent, R.N., Chairman of George Kent Ltd., at the annual ceremony at the Luton Works on November 18. Four members received the award for 50 years' service and 28 the certificate marking the completion of 25 years. The award for 50 years consists traditionally, in an endorsement on the long-service certificate with a cheque for £25.

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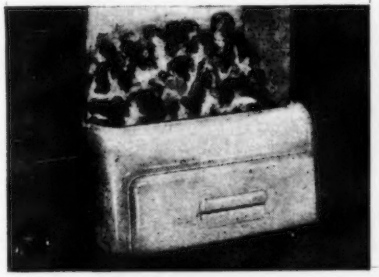

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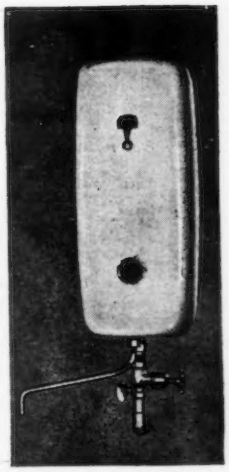

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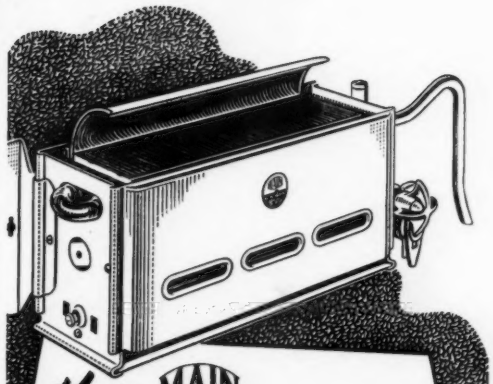

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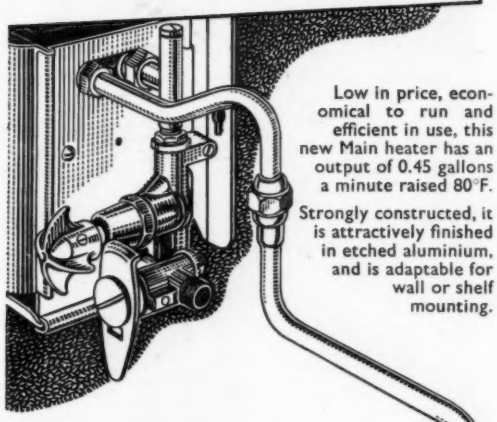

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low priced to meet popular demand

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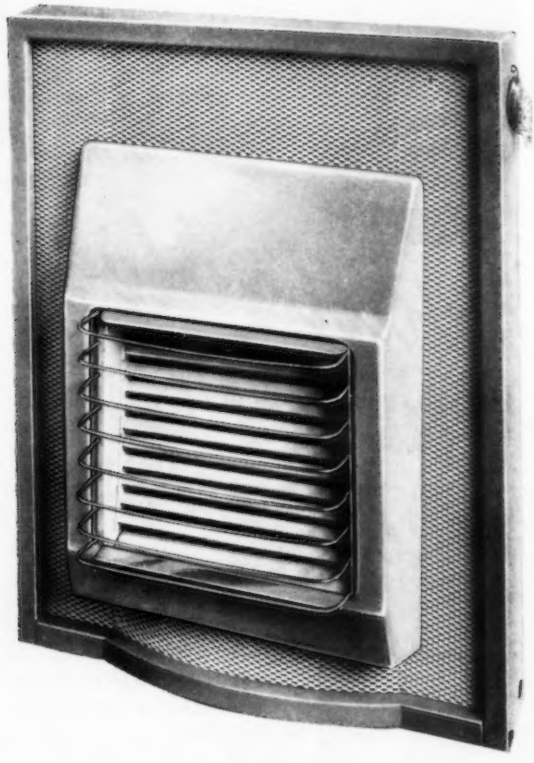

They'll want to see The CONRAY Gas Fire

All of your consumers still using an old-fashioned method of heating are potential ConRay owners. An extensive advertising campaign has been planned to introduce the ConRay to the home owner, and emphasis is on ConRay's obviously superior design and convector radiant heat principle. Make sure you are in a position to take advantage of the many enquiries you'll be receiving in the next few months.

ConRay

CONVECTOR RADIANT FIRE

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Proprietors: Allied Ironfounders Ltd., makers of cookers, boilers, fires and baths

Mr. D.J. Whiley

MACLAY MEMORIAL PRIZE WINNERS

Presentations at Institution Research Meeting

Mr. M. Gillett

Two of the three winners of the James Archibald Maclay Memorial Prize were presented with cheques for nine guineas at the Research Meeting of the Institution of Gas Engineers held at Church House, Westminster, on Tuesday, November 22. They were Mr. David J. Whiley, of the North Thames Gas Board, and Mr. Michael Gillett, of the South Western Gas Board. The cheques must be used for the purchase of books and instruments.

The third prize-winner, Mr. C. Gardiner, is now working with the Brisbane Gas Company, of Australia, and was therefore unable to attend the meeting. Instead, his cheque will be posted to him.

The Memorial Prize was endowed in 1946 by friends of James Archibald Maclay in recognition of his more than sixty years' service to the gas industry.

Mr. Whiley, 37, won the prize for Gas Salesman and Consumer Service. He was trained at Westminster Technical College and Westminster College of Commerce for a certificate in Gas Salesmanship and Consumers' Service. In 1936 he joined the Gas Light & Coke Company as a clerk at the head office in the store buyers' department. He trained at Watson House in 1951 as a representative, and has since been employed as District Representative at the Hornsey office of the North Thames Gas Board. He is Chairman of the British Gas Staff Association, N.T.G.B., Northern Branch, an ex-member of the B.G.S.A. National Council and of the North Thames Area Joint Council for gas staffs, a member of the editorial committee of *Thermfare*, and is also the B.G.S.A. Publicity Officer for the N.T.G.B.

Mr. Gillett, 25, joined the Weston-super-Mare Gas Company at the age of 16, and served a training period of five years. After completing his National Service he became Technical Assistant to the Distribution Engineer. He now holds the post of Technical Assistant to the Divisional Distribution Engineer in the Weston/Taunton Division of the South Western Gas Board. The examination in Gas Technology Manufacture for which he was awarded the Maclay prize was a qualifying examination to enable him to submit a diploma thesis on a distribution subject.

Mr. Gardiner, 30, won the prize for Gas Technology Supply. He was trained at Farnworth in Lancashire, and first entered the service of the Wales Gas Board in 1950, when he was appointed as a Technical Assistant at the Llandudno Undertaking. Later he was appointed as Technical Assistant at the Neath Undertaking and, with the closing down of gas manufacture at Neath, in May last, he took up a post at the Pontypool Undertaking, leaving there for the post in Brisbane.

Call for Reduction in Coal Consumption

During the course of a speech to the Scottish Council in Edinburgh, Mr. Geoffrey Lloyd, Minister of Fuel and Power, said that he had come to Scotland to ask all managing directors of companies, large and small, to save 10% of the coal they would normally burn this winter, a saving which he believed would turn the scales between safety and shortage. He said that any technical problems could be solved with the help of the National Industrial Fuel Efficiency Service, and monetary difficulties in the installation of new fuel-saving equipment could probably be met by the Government loan scheme which had already advanced more than £150,000 to Scottish firms for this purpose.

Mr. Lloyd gave figures showing that the contribution Scotland could make would be about a ¼ mill. tons of coal towards the national target of 2 mill. tons. Mr. Lloyd emphasized that every form of energy had to be exploited, and described developments in the various fuel and power industries. The Scottish Gas Board intended to install an oil gasification plant at Dundee which would produce at the rate of 2½ mill. cu.ft. a day by 1958, and that projects for the easing the supply of gas by the linking of large existing works were in hand.

On November 22, the Hon. L. W. Joynson-Hicks, Parliamentary Secretary to the Minister of Fuel and Power, adressed the North Midlands Regional Board for Industry at Nottingham in a similar vein to Mr. Lloyd's speech in Edinburgh as part of the Government's coal economy campaign. He appealed to managements in the Midlands to do their utmost to save fuel, and said that already 2,000 firms in the Midlands had called upon the services of N.I.F.E.S.

For Men Only

The Cardiff Undertaking of the Wales Gas Board has recently carried out an experiment in an endeavour to gain the interest shown by men in problems of cookery. Male employees of the Cardiff Undertaking were invited to make application to be included in a cookery class for men only. Within 10 minutes of the notice being posted on the Staff Notice Board a number of applications were received which would have been sufficient to fill three classes. The first twenty names on the list were selected to attend the first series of six evening classes at which general principles of cookery were to be taught. On the seventh evening each of the male employees is being allowed to invite a lady friend and a full meal will be prepared and served by the men to the ladies. This final stage of the course will be treated as a competition and marks will be awarded to each competitor. The successful competitor will receive a pewter tankard from the Undertaking.

Coleraine Using More Gas

Coleraine Gas Committee's report which was adopted at a meeting of the Borough Council stated that from September 28 till November 2 the amount of gas manufactured was 18,744,300 cu.ft., an increase of 898,800 compared with the corresponding period last year. The conversion works on the water gas plant in connection with the gasification of oil were now under way. Answering a question the Town Clerk said the total amount of discount paid to large consumers of gas for the year ended March 31 last was £1,650 5s. 5d. Mr. A. Sutherland asked if the Council were not being too liberal in the paying of discount to large gas consumers. They could find that they were not covering production costs. The Mayor replied that the whole question was being looked into, and would be reviewed by the Council in the near future.

The Teddington Group of Companies have opened a new branch office and trade counter at 255, St. Vincent Street, Glasgow (Telephone: Glasgow Central 3933, Telex 77-155). This office will handle local enquiries for Scotland and make over-the-counter sales. The Teddington Group of Companies includes the British Thermostat Co., Ltd. Teddington Industrial Equipment, Ltd., and Teddington Refrigeration Controls, Ltd., at Sunbury-on-Thames, Teddington Aircraft Controls, Ltd., at Merthyr Tydfil, P. W. Baker & Sons (Sales), Ltd., Woking, Surrey, and P. W. Baker & Sons, Ltd., at Norwich, Teddington (Holland), N.V., Nieuwkoop, Holland, and Société des Thermostats, Paris.

The price of gas in Dublin has been increased by 1d. per therm, the Alliance and Dublin Gas Consumers Company has announced. On and after January 1 the price will be increased by a further ½d. per therm.

GAS CONSULTATIVE COUNCILS

Is Superannuation Over-subsidized?

At last week's meeting of the North Thames Gas Consultative Council, a member questioned the method of superannuation valuation by 'the soothsayers of superannuation, the high priests of hypothesis, the actuaries.' This exceptionally high tone of oratory was struck by Alderman H. D. Cowan, of Ilford, Essex, who had submitted a number of questions to the Chief Accountant of the Board, Mr. O. W. Wells, about the annual report and accounts. Alderman Cowan is Chairman of his Local Authority's finance committee.

He told the Council: 'Surely the idea of a superannuation fund is to build up an interest-earning fund so that after a given period of time—usually about 40 years—an employee will recoup the amount he has paid in. We employers are being called upon to subsidize this fund to an extent never contemplated and far in excess of the normal.'

His contention was that the actuaries were over-cautious and were apt to make 'too generous computations of future commitments and possible liabilities without the same regard to the present state of the fund and contributions thereto.'

One salient feature which had struck him was that the actuaries did not seem to see that the flow into the fund was never-ending and that it was impossible to compute for perpetuity as they were prone to do. He had asked the Chief Accountant: 'Have you examined in detail the actuarial statement of deficiencies and how it is computed?'

Mr. Michael Milne-Watson, Chairman of the Board, who was present also to answer questions about the report, rose to comment mildly that Mr. Cowan was obviously a young man. Would he be equally happy at the age of 65 if there was not enough money in the fund because of his predecessor? They must behave in a way they considered to be honest to their employees.

Alderman Cowan: What I am asking is that a body of this type examines the position and does not take it for granted. There is no question of providing for the future. I am asking for an examination by a man of Mr. Wells' knowledge.

Low Coal Quality

Another Alderman, Mr. H. Olding, commented on the low quality of coal carbonized, as it was revealed in the report.

Dr. Burns, G.M., Chief Engineer of the Board, another member of the strong batting side, said they had come to expect a certain standard of coal from the N.C.B. 'We also get coal that is thoroughly bad. When that happens we have no compunction whatsoever about sending it back. The amount is not so very great.'

On the general standard of coal, he thought the N.C.B. had some real difficulties in the changeover of their mining methods. For one thing they were now increasing the amount of machine mining which meant a greater inclusion of stone. To counteract that they were introducing some very big washeries in the Durham coal fields—'which are not so very successful.'

It was true that these washeries took a certain amount of the ash from the coal but they replaced it with moisture. 'At one stage we had difficulty in accepting coal coming from these washeries. But we had to work along with the Coal Board to solve their problems and we have been able to effect some improvement.'

The older seams of coal, concluded Dr. Burns, were running out and the younger ones produced the lower quality coal to which Alderman Olding had referred.

Alderman Olding: Are we married to Durham coal?

Dr. Burns: To the extent of about 75%. This quantity is brought in by sea—the remaining 25% by rail.

With the crisp, lawyer-like attacks of Mr. Cowan and the extreme competence of Mr. Milne-Watson and his team, this Consultative Council meeting must surely go on record as one of the most interesting in years. A certain panel-game quality was introduced towards the end when one questioner tried to pull the wool over Mr. Milne-Watson's eyes about an area which the Chairman knew very well, and when another, a woman, queried the meaning of 'carrier gas' in the report. She had wondered, she said, if it could be purchased in paper bags.

Speedier Circulation of Annual Report Urged

The North Eastern Gas Consultative Council at its meeting in Leeds on November 21, was given an assurance that in future members would receive their copies of the North Eastern Gas Board's annual report and accounts earlier than they have in the past—and certainly not (as was alleged, had been happening for some time) a week after reports on the documents had appeared in local newspapers. This assurance was given by Dr. R. S. Edwards, Chairman of the Board, after consideration of the following resolution:—That this Committee recommends the Council to request the North Eastern Gas Board to ensure that in future copies of its annual reports and accounts are made available to members of the Council and if possible to local committees, not later than they are made available to the Press.

Alderman Sutcliffe, Leeds, and Councillor Clough thanked Dr. Edwards for his consideration and assurance. Alderman Regan gave a brief report of the meeting of the Gas Consultative Council Chairmen and Deputy Chairmen in London, and the annual report and accounts of the North Eastern Gas Board after a brief discussion were accepted and approved.

In answer to questions on the Board's summary of manufacturing results, sales of appliances, etc., during the six months ending September last, Dr. Edwards said there had been a slight reduction in the smaller industrial connections and a few disconnections but there was no serious adverse tendency. Dr. Edwards mentioned that the high price of coal had come to stay and they could not expect any early reduction in the cost of either coal or gas.

Alderman Whitaker of Todmorden in moving that the annual report and accounts for the year ending March 31 be approved, put in another plea for uniform tariffs as between industrial and domestic supplies. Dr. Edwards said he was sorry the Board disagreed with Alderman Whitaker.

In reply to further questions by Alderman Clough, Dr. Edwards said the report on the joint collection of gas and electricity accounts was now in the hands of the appropriate authority and that a final decision will be announced in the near future. Dr. Edwards said he noted Councillor Clough's suggestion that the Board look very carefully into the matter of the hire purchase of appliances and he assured Councillor Clough that the Board was indeed adopting a cautious policy in that matter.

Publicity

Several members, including Alderman Hardy (Morley), and Alderman Sellers (Leeds), drew the attention of Dr. Edwards to what was being done by the electricity people both in the sale of electricity and electrical appliances. The electricity people, it was stated, were very persistent at the moment in telling local authorities the advantages of electricity on housing estates.

Alderman Sellers said that if it was possible to adapt electricity selling methods to gas the gas industry would, he thought, benefit considerably. Good advertising was yielding good results in the electricity business. Dr. Edwards said that both electricity and gas industries had recently agreed to restrict their advertising and that gas was more subject to Government control than electricity.

Over 1,000 housewives of Stirling attended the week's cooking demonstration, sponsored by the Scottish Gas Board, in the Golden Lion Hotel. Mr. William M. Gladhill, sub-group manager, Stirling, and Mr. J. G. McEwan, sub-group sales officer, Stirling, were responsible for the arrangements.

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BALE & CHURCH, LTD.
1, CROMPTON WAY, CRAWLEY, SUSSEX

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FOR SALE: NEW GAS-FIRED BOILER by Hartley & Sugden. 160 lbs./hour at 80 lbs. p.s.i., complete with chimney, spare burner and controls. Original purchase price was £419. Our price £200. W. H. COLLINGBOURNE & CO., LTD., 1481, Stratford Road, Birmingham, 28. Phone: Shirley 3303.

STAINLESS STEEL
BARS, SHEETS AND TUBES
URGENTLY REQUIRED
Prompt attention to all offers
The Mulberry Company,
Castle Wharf, Orchard Place, London, E.14.
Telephone No. EAS. 4471.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DEVELOPMENT Chemist required for Manchester Area. State qualifications, experience, age and salary required. Apply: No. 266, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

NORTHERN GAS BOARD

DARLINGTON DIVISION

APPLICATIONS are invited for the following positions:

(a) DIVISIONAL CHIEF CHEMIST

Candidates should be qualified to undertake full responsibility, under the Works Manager, for supervision of chemical staff, for all chemical testing, control of Glover West Vertical Retort Installation, modern C.W.G. Plants and ancillary equipment. Corporate Membership of the Institution of Gas Engineers or equivalent qualification will be an advantage.

The salary will be within Grade APT. 9 Provincial "A" (£700-£800 per annum) of the National Salary Scales, initial placing according to experience and qualifications.

(b) SHIFT ENGINEER

Candidates must have had experience in the control and operation of a Glover West Vertical Retort Installation, modern C.W.G. Plants and ancillary equipment.

The salary will be within Grade APT. 6 Provincial "A" (£565-£645 per annum).

Successful candidates will be required to pass a medical examination and be subject to the Board's Pension Scheme.

Applications, stating age, experience, qualifications and the names of two persons to whom reference can be made should be addressed to the undersigned not later than December 10, 1955.

F. WILSON,
Divisional General Manager.

Gas Office,
John Street,
Darlington.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited for the following pensionable appointments:—

CENTRAL LANCASHIRE GROUP
ENGINEERING DRAUGHTSMAN

The salary will be within Grades A.P.T. 7/8 (£620/£740 per annum).

Applicants should have a sound engineering training and should be experienced in the design and construction of steel work, mechanical handling, etc. Some knowledge of building construction would be an advantage.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Central Lancashire Group, Gas Offices, Dane Street, Rochdale, within 14 days.

NORTH CHESHIRE GROUP
TECHNICAL ASSISTANT (PRODUCTION)—DENTON NEW WORKS

The salary will be within Grade A.P.T. 7 (£620/£700 per annum).

Applicants must have had experience in the maintenance, operation and efficient working of all types of gasworks plant.

Detailed applications, appropriately endorsed, giving the names of two referees, should reach the General Manager, N.W.G.B., North Cheshire Group, Gas Works, Portwood, Stockport, within 14 days.

PRESTON GROUP
SHIFT ENGINEER—LOSTOCK HALL WORKS, PRESTON

The salary will be within Grade A.P.T. 7 (£620/£700 per annum).

Applicants should have had practical experience in the operation and maintenance of vertical retorts and C.W.G. plants and be capable of supervising general gas works plant operations. A modern house will be available if required.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Preston Group, 108, Fishergate, Preston, within 7 days.

NORTHERN GROUP
DRAUGHTSMAN—DISTRIBUTION DEPARTMENT

The salary will be within Grades A.P.T. 7/8 (£620/£740 per annum).

Applicants should be qualified draughtsmen and have had experience in structures and pipe layout. A knowledge of gas distributing systems, including boosters and governors, and the maintenance of plan records would be an advantage. The successful applicant will be stationed at Lancaster.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Northern Group, St. George's Quay, Lancaster, within 14 days.

WALES GAS BOARD

CHIEF ACCOUNTANT'S DEPARTMENT—APPOINTMENT OF PENSIONS OFFICER

APPLICATIONS are invited for the above appointment, at a salary of £1,050 per annum. The post is pensionable.

The selected candidate may be required to pass a medical examination.

Candidates must have had experience of the management of pension schemes and preference will be given to those who have practical knowledge of the introduction and management of Gas Staff Pension Schemes.

Applications, stating age, particulars of present and all previous appointments, together with the names of two referees, should reach the undersigned within three weeks of the appearance of this advertisement.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

ASSISTANT INDUSTRIAL RELATIONS OFFICER

APPLICATIONS are invited for the post of ASSISTANT INDUSTRIAL RELATIONS OFFICER at the Area Board Headquarters, Cardiff.

The successful candidate must possess knowledge of personnel management and in particular, the principles and methods of determining salaries, wages and conditions of service of employees in a large scale organisation.

Applicants should preferably have had practical experience of Staff establishment work and of the conduct of joint negotiations on an Area and National basis. Candidates should also possess experience in the application of education and training schemes.

Salary according to qualifications and experience within the range £760/£960 per annum. The post is pensionable.

The successful candidate will be required to undergo a medical examination.

Applications, stating age, particulars of education, present position, qualifications and experience, together with the names of two referees, should be received by the undersigned not later than December 12, 1955.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

Classified advertisements continued on page 606

APPOINTMENTS VACANT (ctd.)

WALES GAS BOARD

PONTYPOOL UNDERTAKING—ASSISTANT STATION ENGINEER

APPLICATIONS are invited for the position of ASSISTANT STATION ENGINEER.

The successful applicant will be responsible for the technical control of production of gas and residual products from a modern Continuous Vertical Retort Installation.

The salary of the post will be within the salary range of £700-£960 with placing according to qualifications and experience. The post is pensionable.

Candidates should be Corporate Members of the Institution of Gas Engineers and should be fully experienced in the control of modern gasworks plant.

The successful applicant will be required to pass a medical examination.

Applications, giving details of age, qualifications, experience and present position, together with the names of two referees, should reach the undersigned not later than December 17, 1955.

A. FACER.
General Manager & Engineer.

Gas Offices,
Hanbury Road,
Pontypool.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
SENIOR CHEMIST—CANNOCK GROUP

CANDIDATES should have had a comprehensive training and experience in all aspects of chemical control of Gasworks plant. A recognised qualification in chemistry would be an advantage.

The salary will be within the range of Grade A.P.T. 7 (£620-£700 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall and District Division, Divisional Offices, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than December 12, 1955.

J. C. INGRAM,
Secretary to the Board.

NORTH EASTERN GAS BOARD

HULL GROUP
CHIEF CHEMIST

APPLICATIONS are invited for the post of CHIEF CHEMIST, Hull Group, stationed at Bankside Gas Works, Sculcoates, Hull, at a salary within Grade A.P.T. 12 (Provincial 'A') (£835-£960 per annum) of the Salary Scales agreed by the National Joint Council for Gas Staffs.

Candidates should be fully qualified and should have a sound general experience of all laboratory work associated with gas production and tar distillation. Possession of a University degree would be an advantage.

The successful candidate will be required to pass a medical examination and to join the Board's Staff Pension Scheme.

Applications giving details of age, experience and qualifications should be sent to A. L. Higham, Esq., Group General Manager, North Eastern Gas Board, Bankside Works, Sculcoates, Hull, so as to arrive not later than December 16, 1955.

J. C. GARDNER,
Secretary.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
TECHNICAL ASSISTANT—GRIMESTHORPE GAS WORKS, SHEFFIELD

APPLICATIONS are invited from suitably qualified persons for the position of TECHNICAL ASSISTANT at Grimesthorpe Works.

Applicants should preferably hold the Higher National Certificate in Gas Engineering and have had experience of horizontal retort installations and carburetted water gas plants.

The salary for the position will be within Grade A.P.T. 7 of the National Salary Scales for Gas Staffs, ranging from £620 to £700 per annum, and the initial placing on the Scale will be in accordance with qualifications, experience and ability.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications, giving details of age, education, training, qualifications and experience, together with the names and addresses of two referees, should be addressed to reach the undersigned not later than December 19, 1955.

C. C. WOOD.
Divisional General Manager.

Commercial Street,
Sheffield, 1.

November 24, 1955.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
APPOINTMENT OF ASSISTANT TO THE DIVISIONAL ENGINEER

APPLICATIONS are invited for the above appointment from candidates with an engineering background and experience in Gas Works practice. A Degree in Engineering and/or Corporate Membership of the Institution of Mechanical or Gas Engineers is an essential qualification.

The salary for the post will be within the range of A.P.T. 10/12 of the National Salary Scales (£760/£960) and the initial placing will be dependent upon the qualifications and experience of the successful candidate.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications giving details of age, education, qualifications and training together with the names and addresses of two referees should be addressed to reach the undersigned not later than December 17, 1955.

C. C. WOOD.
Divisional General Manager.

Commercial Street,
Sheffield.

November 21, 1955.

NORTH THAMES GAS BOARD

A STEAM and POWER FOREMAN is required at the Gasworks, Fulham, S.W.6, which has a steam capacity of 150,000 lbs./hr.

Candidates should be experienced in the maintenance and operation of chain grate stokers and waste heat boiler plant. Starting salary within the range £595-£675 per annum, according to age, qualifications and experience. The successful candidate will be required to join the Staff Pension Scheme.

Applications, giving age and full particulars, should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference 666/289.

NORTH THAMES GAS BOARD in**ites ap**
tions from CHEMISTS, who hav**e obtai**
First or Second Class Honours Degree, **for vac**
at its Chemical By-Products Works, **eckton,**
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with coal tar distillation; and the m**anufactu**
phenols, naphthalene and bases.

Preference will be given to those **who hav**
some post-graduate experience in **researc**h **partic**
in subjects related to those mentioned **above.**

These are permanent appointments **and offer**
prospects of advancement.

Successful candidates will be **required to jo**
Staff Pension Scheme. Starting salaries **will be a**
ing to age and qualifications.

Applications giving age and full **detail**s of **tr**
and qualifications should be addressed to **the**
Controller, North Thames Gas Board, **30, Kens**
Church Street, W.8, to reach him by **not later**
14 days after the publication of this **advertise**
quoting reference 666/288.

EXCEPTIONAL OPPORTUNITY FOR QU
FIED ENGINEER WITH PIPELINE
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immediately (1) CONSTRUCTION SUPERIN
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Natural Gas Project in WEST PAKISTAN. D
ing on qualifications and experience salary **w**
£180-£220 per month with free board and **a**
modation, medical attention, etc. Reply **statin**
when available, and giving full details of **tr**
and experience, to Box G.J. 407, c/o. 191, **Gr**
House, E.C.2.

SCOTTISH GAS BOARD

WESTERN GROUP
JOHNSTONE DISTRICT

APPLICATIONS are invited from suitably qupersons for the position of MANAGER of **t**
District and any extension thereof.

Applicants, who must be Corporate Membe**r**
the Institution of Gas Engineers, should have
experience in the control, operation and admi**n**
tion of a medium sized Gas Works.

The salary will be on a Scale £1,000 to £1,2**0**
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will be according to qualifications and exper**i**
A house for which rent will be paid is **ava**i**l**

The successful applicant may be required t**o**
a medical examination and will be required t**o**
the Board's Pension Scheme.

Applications, endorsed "District Mana**g**
Johnstone," stating age, training, qualification**s**
experience, together with the names of two re**f**
should reach the undersigned on or before Sat**u**
December 10, 1955.

ALEX. JAMIES**O**
Group Mana**g**

"Kessington,"
29, Union Street,
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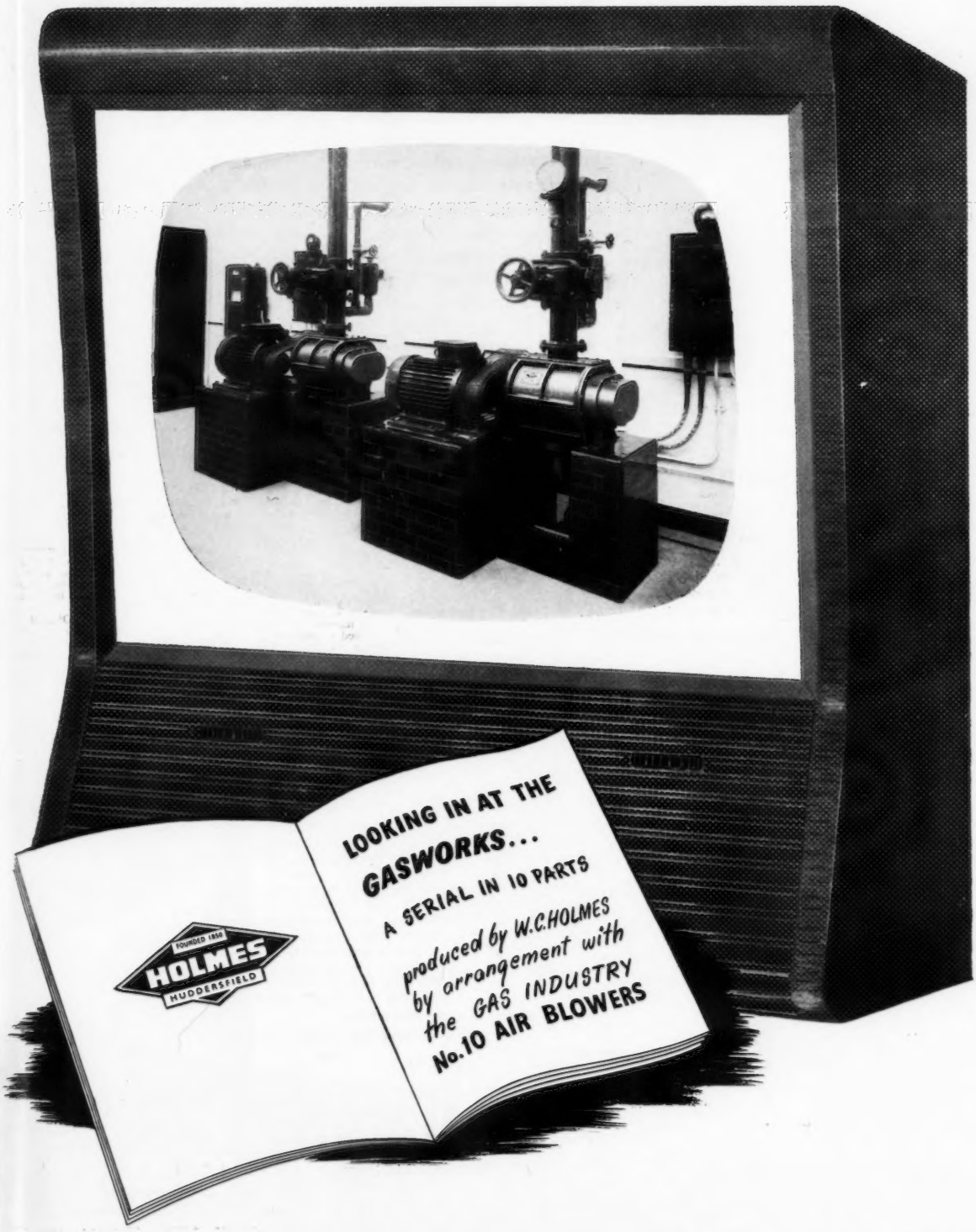

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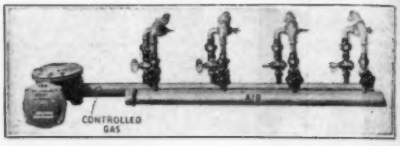

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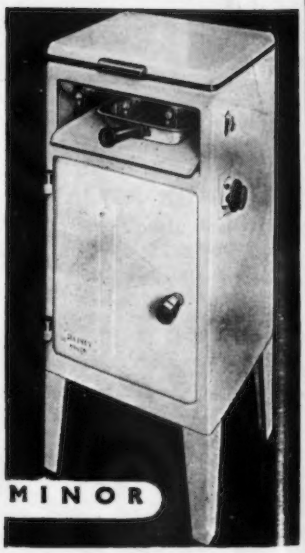

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